

PROGRAMMER'S MANUAL

BPLA

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Overview

Command definition

BPLA has four types of commands as immediate command, system-level command, extended-system command and label-formatting command.

➤ **Immediate command**

Immediate commands are performed immediately when received and are mainly used to do immediate status query and control of printer including reset, pause/stop when needed.

Except immediate commands, all other commands are interpreted and performed in sequence by commands interpreter.

➤ **System-level commands**

System-level commands are mainly used for printer test, temporary configuration, fonts and images (multiple bitmap formats including BMP, .PCX,.IMG, HEX, etc.) download, label formation definition, field update, print execution and other functions. BPLA supports label's rotation, mirror image and horizontal copy functions.

➤ **Extended-system commands**

Extended-system commands are performed for permanent configuration of the printer, i.e. the parameters are fixed to EEPROM as the printer attributes. The printer shall run according to EEPROM configuration after its reset.

➤ **Label-formatting commands**

Label-formatting commands are mainly used to describe attributes of each record that a label consists and define the label's printing parameters, also finish the print at last.

BPLA supports horizontal and vertical field layout, up to 8 times character enlargement, 0°/90°/180°/270° degrees clockwise rotation, mirror image, multi-bit handling mode, character space adjustable, 20 kinds of one-dimensional barcodes, 2 kinds of two-dimensional barcodes, 3 kinds of units (mm, inch, dots). To facilitate user for programming, BPLA provides a global register for users to store and recall label formats and realize alphanumeric successive field functions.

Key words explanation

BPLA supports two memory modules as blow:

- A: RAM--including internal RAM and expanding RAM. RAM can perform download, citation, deletion and compression, etc.
- B: Expanding flash-- it can perform download, citation and deletion, but not compression.

Each module capacity refers to User's Manual of each model.

BPLA support 3 kinds of units as below:

- Dot: When the metrical unit of printer is dot, relevant data unit in BPLA is "dot". For 203DPI, one dot equals about 0.125mm. For 300 DPI, one dot equals about 0.085mm. For example, system command <STX>c1000, sets paper length to be 1000 dots.

Metric: When the metrical unit of printer is meter, relevant data unit in BPLA is "mm/10". Then this data settings which is divided by 10 is mm value. For example, system command <STX>c1000 sets paper length to be 100 mm.

Inch: When the metrical unit of printer is inch, relevant data unit in BPLA is "inch/100". Then this data settings which is divided by 100 is inch value. One inch equals to 25.4 mm. For example, system command <STX>c1000, sets paper length to be 10 inch.

The default unit is metric when the print is out of factory. In printing, you can respecify metrical unit via system commands as <STX>m,<STX>N,<STX>n

Command format

[Function]——Describe the function of command.

[Data format]——Explain the data format of command, eg. ASCII, hex, and decimalist.

[Value range]——Explain the value range of parameter for selection in command.

[Notes]——Explain main performance of command and matters needing attention during the usage of command.

[Default]——Explainthe initial value of parameter bing used when starts the printer.

[Relevant command]——Explain other commands which is relative with the current command.

[Example]——Expamples are used for current or relevant commands.

All the command data used in example are in hex, and all the normal fonts and characters are data. No notes will be used in the command example, eg. 42' 43 are data. Underlined bold fonts and characters are commands, eg. **1B 40**. All the contents in the brackets after commands in the examples are notes for explaining command meanings, the brackets and contents in them are not commands which need to be sent to printer.

Command description

Immediate commands <SOH>

When the printer receives an Immediate Command, its current operation will be momentarily interrupted to respond to the command. Immediate commands may be issued before or after system commands, but may not be issued among label-formatting commands.

| Command character | Command function |
|-------------------|-------------------------------|
| <SOH># | Reset printer |
| <SOH>A | Send printer status in string |
| <SOH>B | Pause printing |
| <SOH>C | Stop/Cancel printing |
| <SOH>D | Shut down immediate commands |
| <SOH>E | Send batch quantity |
| <SOH>F | Send printer status in byte |
| <SOH>G | Send printer status in string |
| <SOH>H | Send printer status in byte |

Table 2-1

SOH # Reset

[Function] Resetting the printer returns all settings to default.

[Data format] <SOH>#

- [Notes]
- In CTS/RTS communication mode, “T” is back after printer sending this recommand and reseted. If the printer is turned on again after being off, it shall send “R”.
 - In XON/XOFF communication mode, first “T” or “R” shall be back after its reset, then send ASCII table as “XON” of 11 Hex.

SOH A Send Printer Status (in string)

- [Function] Send Printer Status(8 characters)
- [Data format] <SOH>A
- [Notes]
- Printer response:ABCDEFGH<CR>
 - ABCDEFGH:See table 2-2
 - <CR> carriage return characet
- [Relevant command] <SOH>G

| Character | Y/N | Description |
|-----------|---------|--|
| 1 | A = Y/N | Interpreter busy |
| 2 | B = Y/N | Paper end / enough |
| 3 | C = Y/N | Ribbon end / enough |
| 4 | D = Y/N | Batch printing mode / non-bach printing mode |
| 5 | E = Y/N | Printer busy / not busy |
| 6 | F = Y/N | Printer paused / non-paused |
| 7 | G = Y/N | Label not presented/presented |
| 8 | H = Y/N | Print/Not print testing page |

Table 2-2

SOH B Pause

- [Function] This command enables the printer shifted in pause/non-pause status. It functions same as “pause” button on the printer control panel.
- [Data format]<SOH>B
- [Notes] This command shall light “stop” indicator and stop the printing until any case below occurs:
- 1) The printer receives <SOH>B command again.
 - 2) “Pause” button on control panel is pressed down.
 - 3) In case of no print task, printer receives <STX>p command.
- Above operation shall turn off the indicator and the printing be resumed.
- [Relevant command] <STX>p

SOH C Stop / Cancel

- [Function] Stop / Cancel
- [Data format] <SOH>C
- [Notes] This command has the same function as that of the CANCEL button. When performed, the current printing will be stopped or canceled. However, the print buffer will not be cleared at the same time.

SOH D SOH Shutdown

- [Function] Shutdown immediate command.
- [Data format] <SOH>D

[Notes] This command causes the printer to ignore immediate commands which should be disabled before loading graphic images or fonts, since some graphic images or fonts may contain data sequences that could be interpreted as an immediate command.

[Relevant command] <STX>H,<STX>I

SOH E Send Batch Quantity

[Function] This command causes the printer to send back a 4-digit number indicating the quantity of labels left to print in the current batch, followed by a carriage return.

[Data format] <SOH>E

- [Notes]
- Communication latency may cause this value to be higher than actual quantity of label on some printers.
 - Printer response: nnnn<CR>
 - nnnn: Four-digit number values between 0000 and 9999.
 - <CR>: Carriage return character

SOH F Send printer status (in byte)

[Function] This command allows the host to check current status of the printer.

[Data format] <SOH>F

[Notes] • Printer will send a byte and a carriage return character. Each bit of this byte represents one of the printer's status, of which 0 is the lowest bit.

- Printer response: X<CR>
- X:See table 2-3
- <CR>:Carriage return character.

[Relevant command] <SOH>H

| Byte | Bit | Value | Description |
|------|-----|-------|---|
| X | 7 | 1 / 0 | Interpreter busy/not busy |
| | 6 | 1 / 0 | Paper end / enough |
| | 5 | 1 / 0 | Ribbon end / enough |
| | 4 | 1 / 0 | Batch printing mode / Non-batch printing mode |
| | 3 | 1 / 0 | Printer busy/not busy |
| | 2 | 1 / 0 | Printer paused / not paused |
| | 1 | 1 / 0 | Label presented/Not presented |
| | 0 | 1 / 0 | Print/ Not print testing page |

Table 2-3

SOH G Send printer status (in character string)

[Function] This command allows the host to request current status of the printer.

[Data format] <SOH>G

- [Notes]
- Printer will send a character string and a carriage return character. Each character of this character string represents one of the printer's status, of which the 16th character is the lowest bit.
 - Printer response:ABCDEFGHabcdefgh<CR>
 - ABCDEFGHabcdefgh:See table 2-4
 - <CR>:Carriage return character.

- Character 10:b value is relevant to system command STX #C.
- Character 15: g value makes sense in using non-continuous paper (for instance label paper), but in using continuous paper it makes no sense and only send N.

[Relevant command] <STX>#C,<SOH>A

| Character | Value Y/N | Description |
|-----------|-----------|--|
| 1 | A = Y/N | Interpreter busy/not busy |
| 2 | B = Y/N | Paper end / enough |
| 3 | C = Y/N | Ribbon end / enough |
| 4 | D = Y/N | Batch printing mode / non-batch printing mode |
| 5 | E = Y/N | Printer busy / not busy |
| 6 | F = Y/N | Printer paused / not paused |
| 7 | G = Y/N | Label not presented / presented |
| 8 | H = Y/N | Print/ Not print testing page |
| 9 | a = Y/N | Serial communication error / normal |
| 10* | b = Y/N | Initialization mark bit is 1 /Initialization mark bit is 0 |
| 11 | c = Y/N | Printhead is overheated / normal |
| 12 | d = Y/N | Reserve |
| 13 | e = Y/N | Printhead open / pressed down |
| 14 | f = Y/N | Cutter overtime error / normal |
| 15* | g = Y/N | In using label, mark is missing / normal |
| 16 | h = Y/N | Print head has / does not have damage. |

Table 2-4

SOH H Send printer status (in byte)

[Function] This command allows the host to check current status of the printer

[Data format] <SOH>H

- [Notes]
- Printer will send a byte and a carriage return character. Each bit of this byte represents one of the printer's status, of which 0 is the lowest bit.
 - Printer response:X Z<CR>
 - X Z:See table 2-5
 - <CR>:Carriage return character
 - The value of byte Z and bit 1 makes sense in using non-continuous paper, but in using continuous paper it only return N and makes no sense.
 - The value of byte Z and bit 6 is relevant to system command STX #C.

| Byte | Bit | Value | Description |
|------|-----|-------|--|
| X | 7 | 1 / 0 | Interpreter busy/not busy |
| | 6 | 1 / 0 | Paper end / enough |
| | 5 | 1 / 0 | Ribbon end / enough |
| | 4 | 1 / 0 | Batch printing mode / Non-batch printing mode |
| | 3 | 1 / 0 | Printer busy/not busy |
| | 2 | 1 / 0 | Printer paused / not paused |
| | 1 | 1 / 0 | Label presented/Not presented |
| | 0 | 1 / 0 | Print/ Not print testing page |
| Z | 7 | 1 / 0 | Serial communication error / normal |
| | 6* | 1 / 0 | Initialization mark bit is 1 /Initialization mark bit is 0 |
| | 5 | 1 / 0 | Printhead is overheated / normal |
| | 4 | 1 / 0 | Reserve |
| | 3 | 1 / 0 | Printhead open / pressed down |

| | | | |
|--|----|-------|--|
| | 2 | 1 / 0 | Cutter overtime error / normal |
| | 1* | 1 / 0 | In using label, mark is missing / normal |
| | 0 | 1 / 0 | Print head has / does not have damage. |

Table 2-5

System-level Commands <STX>

The most common commands are the system-level commands. These commands are used to invoke, store graphic information and control the printer. System-level commands may be used before or after immediate commands but not among label formatting commands. Except for specially specified system-level commands, the current settings are only available and shall be return to defaults when restart the printer.

| Commands | Functions |
|-----------------|---|
| <STX>#D | Set gray mode |
| <STX>#E | Set watermark mode |
| <STX> % | Print Position Fine Adjustment |
| <STX> & | Feed and Back Labels |
| <STX>: | Set Character Smooth Enlargement mode on/off |
| <STX> A | Set LCD |
| <STX> a | Enable Auto Status Back |
| <STX>B | Set time and date of printer |
| <STX> b | Download Dot-matrix Bitmap Font |
| <STX> c | Set Paper Length |
| <STX> d | Set Printer to Double Buffer Mode |
| <STX> E | Set Quantity for Stored Label |
| <STX>e | Select transmissive sensor |
| <STX> F | Feed label |
| <STX> f | Set print stop position |
| <STX> G | Print current stored label |
| <STX> H | Enable Immediate Commands |
| <STX> h | Horizontally Duplicate Printing |
| <STX> I | Input Graphic Data |
| <STX> j | Software DIP Switch Setting |
| <STX> JB | Enable / disable auto verify function |
| <STX> Jb | Enable / disable auto verify function |
| <STX> JC | Enable verify by hand |
| <STX> JD | Self-test page/LED language settings |
| <STX> JE | Enable / disable error and reprint functions |
| <STX> JG | Enable / disable print graphic when verifying by hand |
| <STX> JZ | Enable / disable buzzer function |
| <STX> JY | Vertical print position adjustment command |
| <STX> K | Extended-system command |
| <STX> k | Test RS-232 interface |
| <STX> L | Enter label format mode |
| <STX> l | Set mirror image print |
| <STX> M | Set and search Maximum Label Length |
| <STX> m | Set Printer to Metric |
| <STX> N | Set Printer to Dot |
| <STX> n | Set Printer to Inch |
| <STX> o | Cutter test |
| <STX> p | Controlled pause |
| <STX> Q | Clear all Modules |
| <STX> q | Clear specified Module |
| <STX> r | Select Reflective Sensor |
| <STX> S | Set Feed Rate |
| <STX> s | Set printer to single buffer mode |
| <STX> T | Printhead Dot Pattern Test Label |
| <STX> t | Test RAM memory Module |
| <STX> U | Label Format Field Replacement |
| <STX> u | Rotary printing |
| <STX> v | Printer's Firmware Version Information |

| | |
|---------|--|
| <STX> W | Request Memory Module Information |
| <STX> w | Test FLASH Memory Module |
| <STX> X | Set default mode |
| <STX> x | Delete Module File |
| <STX> Y | Output Sensor Values |
| <STX> Z | Print Internal Information and Dot Pattern |
| <STX> z | Pack Module |
| * | Explanatory Line |

Table 2-6

STX #D Set gray mode

[Function] Set gray mode.

[Data format] <STX>#Dm

[Value range]

- m =1 Enter into gray mode.
- m =0 Exit from gray mode.

[Notes] This command is only used to set gray mode when grady printing is needed.

[Default] Non-gray, that's m=0

STX #E Set watermark mode

[Function] Set watermark mode.

[Data format] <STX>#En<Name><CR>

[Value range]

- n =L Watermark bitmap is left-aligned.
- n =M Watermark bitmap is centered .
- n =R Watermark bitmap is right-aligned .
- <Name> Download bitmap name.

[Notes] Enable the downloaded bitmap, that's to make the downloaded bitmap as the watermark bitmap. This bitmap will be printed as the watermark bitmap when watermark bitmap needs to be printed.

[Default] n=M

STX % Print position fine adjustment

[Function] When being not aware of the relative position of label to the printhead, use this command to adjust the label to the position specified by the printer parameters.

[Data format] <STX>%

[Notes] This command is only effective for non-continuous paper. When using continuous paper, the printer does not response to this command.

STX & Feed and Back Labels

[Function] This command instructs the printer to feed and back the label.

[Data format] <STX>&nnnnTTTT

[Value range]

- nnnn:A 4-digit number between 0000 and 9999 used to specify the label feed/back length. The unit may be dot, mm/10 or inches/100.
- TTTT: A 4-digit number between 0000 and 9999 used to specify the wait time. The unit is ms.

[Notes] This command instructs the printer to feed the label for a specified length and wait for a specified time period, then to back label for the specified length, namely the label is back to its original position.

STX :Set Character Smooth Enlargement mode on/off

[Function] This command is used to set the printer to use or not use the character smooth enlargement mode.

[Data format] <STX>:n

- [Value range]
- n=1:Disable character smooth enlargement mode;
 - n=0:Enable character smooth enlargement mode.

[Default] By default settings, this mode is always enabled.

[Notes] When this function is enabled, enlargement could be set as 1 to 8 times.

STX A Set LCD (not available)

[Function] This command is used to set whether the LCD shows printed page quantity of current lot and total pages quantity after power on.

[Data format] <STX>An

- [Value range]
- n=1:Enable this function;
 - n=0:Disable this function.

[Default] By default settings, initialization mark bit is 0.

STX a Enable Auto Status Back (ASB)

[Function] This command enables Auto Status Back function;

[Data format] <STX>a

[Notes] When this command enables ASB function, the feedback ASCII HEX characters 49, 1E and 1F to be returned from the printer after specific events. When the printer returns character 49 from an invalid command, 1E is returned after each label is printed and 1F is returned after each batch of labels is printed. (Refer to table 2-7).

| Event | Printer's response |
|-----------------|--------------------|
| Invalid command | (I) 0x49 |
| Label printed | (RS) 0x1E |
| End of batch | (US) 0x1F |

Table 2-7

STX B Set time and date of printer

[Function] Set the time and date of printer real-time clock (RTC).

[Data format] <STX>Bwmmddyyyhhmmjjj

[Value range] See table 2-8

[Default] A0

[Notes] Available commands when RTC enable:

| | |
|----|--|
| W | Week day in one character; 1=Monday; 7=Sunday |
| mm | Month in 2 characters |

| | |
|------|--|
| dd | Day in 2 characters |
| yyyy | Year in 4 characters |
| hh | 24-hour time format in 2 characters |
| mm | Minute in 2 characters |
| jjj | Julian date in 3 characters, program will auto calculates this value and the setting has no effect . |

Table 2-8

STX b Download Dot-matrix Bitmap Font

[Function] This command is used to download dot-matrix bitmap font.

[Data format] <STX>bmtnnName<CR> wwwwhhhhqqiicccdata...

[Value range]

- m: The module where the font has been stored. A: RAM. or B: Flash
- t: Font type to be downloaded:
 - 0:single byte font
 - 1:double bytes font(Chinese characters)
 - 2: GB 18030—2000 character set
 - 3: double bytes self-defined font

area code:the start is fixed as 0x80,its range: 0x80~0xFE

bit code:the start is fixed as 0x00,its range: 0x01~0xFE(except 0x0D)

nn: Font ID is 2-digit decimal number,ID range: [00 99]. Excerpt the font via ID in the record.

Name: Font name (Maximum 8 characters). When <STX>x command deletes font file, this font name is used.

<CR>: 0x0d Carriage return

www : Dot width of the font (4 digits).

hhhh : Dot height of the font (4 digits) downloaded

qq: Start code of dot-matrix font (2 Hex ASCII characters):

- t=0, qq= 00
- t=1, qq= area code of the Chinese character (its range: 0XB0~0XF7)
- t=2, qq=00, reserved
- t=3, qq= area code of start Chinese character,fixed as 0x80

ii: Start code of dot-matrix font (2-digit ASCII characters):


- t=0, ii= Code of start ASCII character (valid range: 0X00~0XFF)
- t=1, ii= Bit code of start Chinese character (valid range: 0XA1~0XFE)
- t=2, refer to cccc
- t=3, refer to cccc

cccc :t=0,1, Character numbers (4-digit decimal number)

- t=2, iicccc forms 6-digit decimal number which shows the quantity of characters.
- t=3, iicccc forms 6-digit decimal number which shows the quantity of characters.

data:Dot-marix Font data. No any other command allowed before data, such as<CR>.

[Notes] The <SOH>D command must be sent to shutdown immediate commands before this command since the bitmap coding of this command is of binary format and the command may contain data sequences that could be interpreted as an immediate command.
 t=3, don't use label format command T in using this font to print. Coding mode of a character:

| | | | |
|--------------|---|--|----------------|
| | First column | | No. WWW Column |
| First row | B7 ... B0 | | B7 ... B0 |
| | B7 ... B0 | | B7 ... B0 |
| |  | | |
| | B7 ... B0 | | B7 ... B0 |
| No. hhhh row | B7 ... B0 | | B7 ... B0 |

Data coding is of binary line mode.
 Code length of the character: $(www+7)/8 * hhhh$ bytes
 Total length of date: $(www+7)/8 * hhhh * cccc$ bytes

STX c Set Paper Length

[Function] Set the paper length.
 [Data format] <STX>cnnnn
 [Value range] • nnnn:4 digits between 0000~9999,unit:Dot, mm/10, inch/100.
 [Default] It shall be the paper length saved in EEPROM when power on.
 [Notes] • In using continous paper, the length set by this command will be saved after power off; In using non-continous paper, the lenght set by this command will not be saved after power off.
 • In using non-continous paper, if the label length set by this command is shorter than actual label length, the printer shall feed the paper with actual label length.
 • If the label length set by this command is longer than the actual label length, the printer shall feed the paper with actual label length and the contents which exceeds the actual label length will be discarded under calibration mode, but printer shall feed paper with integral times of actual label length under calibration-free mode.

STX d Set Printer to Double Buffer Mode

[Function] This command instructs the printer to enter the double buffer mode.
 [Data format] <STX>d
 [Value range] nnnn:4 digits between 0001~9999.
 [Notes] If the memory needs more than half of the total available memory, the printer shall shift automatically in single buffer mode.
 [Relevant command] <STX>s

STX E Set Quantity for Stored Labels

[Function] This command sets the number of labels to print for the label format currently stored in the print buffer.

[Data format] <STX>Ennnn

[Value range] nnnn: 4 digits between 0001~9999.

[Notes] The most recent label sent to the printer will automatically remain stored in the buffer until the printer is reset or turned off. This command is used in conjunction with the <STX>G command, which will print the current label.

[Example] The printer will print 50 pieces of label saved in memory:

<STX>E0050

<STX>G

[Relevant command] <STX>G

STX e Select Transmissive Sensor

[Function] This command sets transmission sensor as the label-detecting sensor;

[Data format] <STX>e

[Notes] After a print task is executed, the value set by the command is saved in EEPROM and is still available when restarting the printer.

[Relevant command] <STX>r

STX F Feed label

[Function] This command feeds one label.

[Data format] <STX>F

[Notes] If using continuous paper, this command will feed the paper for a label length. If using labels, the printer goes to the start of print position for next label.

STX f Set Print Stop Position

[Function] This command sets the stop position of the printed label.

[Data format] <STX>fnnn

[Value range] nnn: A three-digit number between 000~999 sets the stop position. Unit: dot, mm/10, inch/100.

[Default] The stop position length is 0 when the printer is turned on.

[Notes] In tear off/ peel off mode, if stop position is zero, the printer will wait for the label to be taken away. If stop position is set to a certain value which is not zero, the printer will directly feed paper at the stop position without detecting whether the labels has been taken away.

[Example] <STX>f230

STX G Print Last Label Format

[Function] This command prints a previously formatted label.

[Data format] <STX>G

[Notes] This command prints a previously formatted label and is enabled only when this label is saved in memory. Firstly, <STX>E command shall set the printing quantity of saved label, and then this command is sent to print.

[Example] <STX>E0050
<STX>G

[Relevant command] <STX>E

STX H Enable Immediate Command

[Function] This command instructs the printer to respond to immediate commands.

[Data format] ASCII H
Hex 48
Decimal 72

[Notes] It is used to enable immediate commands after having finished downloading graphic images or fonts. Also, it may be used in conjunction with the command <SOH>D.

[Relevant command] <SOH>D

STX h Horizontally Duplicate Printing

[Function] This command instructs the printer to do horizontally duplicate printing.

[Data format] <STX>hnndddd

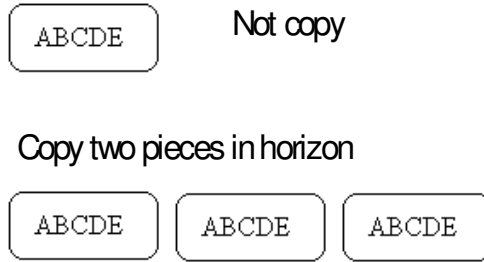
[Value range] • n: Quantity of labels to be copied: one digit between 0~9
• dddd :Internal between label: 4 digits between 0000~9999, unit:dot, mm/10, inch/100

[Default] Horizontal copy is not available.

[Notes] This command instructs the printer to print parallelly several same labels on one label paper when the print width (namely actual print buffer width set) is far less than the printhead width. If label width copied is over the Printhead width, the complete label can be printed only.

[Example] When Max. print width is 108mm,the lable with 20mm width and 10mm height is used. In copying two pieces of ABCDE horizontally, the interval shall be 4mm:

```
<STX>m
<STX>c0100
<STX>Kw0200
<STX>h20040
<STX>L
131100000100010ABCDE
E
```



STX I Input Image Data

[Function] This command applies to the download of image data from the host to the printer.

[Data format] <STX>labfnnnnnnnn<CR>data

- [Value range] • a :A or B,Memory Module Select
- b :Data Type,A or omit

| b value | Image Data Value Range |
|---------|----------------------------------|
| A | ASCII Characters 0-9, A-F (7bit) |
| Omitted | 00-FF (8 bit) |

Table 2-9

- f :Format Designation: F,f,B,b,l,i,P,p

| Designation | Format |
|-------------|---|
| F | 7 bit Hex format (See Appendix 4) |
| f | Binary line coding bitmap(See Appendix 4) |
| B | .BMP 8 bit format, 256 color or B/W (Image will be flipped) |
| b | .BMP 8 bit format 256 color or B/W |
| l | .IMG 8 bit format(Image will be flipped) |
| i | .IMG 8 bit format |
| P | .PCX 8 bit format(Image will be flipped) |
| p | .PCX 8 bit format |

Table 2-10

- nnnnnnnn :Up to 8 characters used as image name
- <CR> : End symbol, carriage return
- Data : Image data

[Notes] The data that immediately follows the command string will be image data. Before executing this command, please disable immediate command with <SOH>D.

[Example] <SOH>D
<STX>IaPTest <CR>
data...data <CR>

[Relevant command] <SOH>D

STX j DIP Switch Setting

[Function] This command controls the current operation conditions same as DIP switches

[Data format] <STX>jammnn<CR>

- [Value range]
- a: 0, 1, 2, 3, 4 specify modified DIP switch detailed as table 2-11~table 2-15.
 - mm: 2-digit Hex number is used to specify the parameter to be changed(1:changed,0: not changed). When a='0', mm means nothing.
 - nn: 2-digit Hex number is used to specify the parameter value to be changed.

a='0'

| DIP0 | Parameter | Description |
|------|-----------|---|
| 0-9 | Baud rate | 0=9600, 1=110, 2=300, 3=600, 4=1200, 5=2400, 6=4800, 7=9600, 8=19200, 9=38400 |

Table 2-11

a='1'

| DIP1 | Parameter | Description |
|------|-----------|---|
| 0 | Reserve | |
| 1 | Reserve | |
| 2 | Reserve | |
| 3 | Stop bit | 0=1 stop bit,1=2 stop bit |
| 5,4 | Parity | 00=none,10=Odd,11=Even |
| 6 | Data bit | 0=8 bit,1=7 bit |
| 7 | Handshake | 0=hardware handshake,1=software handshake |

Table 2-12

a='2'

| DIP2 | Parameter | Description |
|------|-------------------------|---|
| 0 | Reserve | |
| 1 | Confirm mark mode | 0= yes,1=no |
| 2 | Reserve | |
| 3 | Continuous field buffer | 0= double buffer mode,1=single buffer mode |
| 5,4 | Paper present mode | 00= cutter, 01=peel off,10=tear off,11=rewind |
| 6* | Paper type | 0=non-continuous paper,1=continuous paper |
| 7 | Print method | 0=Thernal, 1=Thermal transfer |

Table 2-13

a='3'

| DIP3 | Parameter | Description |
|------|--|----------------------|
| 1,0 | Unit | 00=mm,01=inch,10=dot |
| 2 | Enable immediate command | 0=enabled,1=disabled |
| 3 | Enable auto status return | 0=Disabled,1=Enabled |
| 4 | Button | 0=Unlocked,1=Locked |
| 5 | Print position fine adjustment when being turned on. | 1=Disabled,1=Enabled |
| 6 | Syntax check | 0=Yes,1=No |
| 7 | Communication check | 0=Yes,1=No |

Table 2-14

a='4'

| DIP4 | Parameter | Description |
|------|--------------------------------|--|
| 0 | Reserve | |
| 1 | LCD display language | 0=Chinese character,1=English |
| 2 | Reserve | |
| 3 | Label in sensor | 0=Installed,1=uninstalled |
| 4 | Printhead position sensor type | 0=Reflective sensor,1=Transmission sensor |
| 5 | Ribbon sensor type | 0=Reflective sensor,1=Transmission sensor |
| 6 | Label in sensor type | 0=Reflective sensor,1= Transmission sensor |
| 7* | Mark sensor type | 0=Reflective sensor,1=Transmission sensor |

Table 2-15

- [Notes]
- Except the special note, the configuration is enabled after executing the command and shall not be saved after power off (except the bit maked with *). It still is previous settings after restarting.
 - The settings with “*”mark is renewed in EEPROM and still available when restarting the printer.

[Example] Send command <STX>j00009<CR>, the baud rate is set to 38400.
 Send command <STX>j23020<CR>, peel off is selected as paper present mode.
 Send command <STX>j48080<CR>, mark sensor is set as transmission sensor.
 Send command <STX>j24040<CR>, continuous paper is selected.

STX JB Enable/disable auto checkout

- [Function] This command can enable/disable auto checkout function. It is saved in EEPROM and shall not be lost when power off suddenly.
- [Data format] <STX>J Bn
- [Value range] n=1 disable auto checkout function.
 n=0 enable auto checkout function.
- [Notes] Auto checkout function, namely before starting the print task, the printer automatically compare user parameter with current stored parameter for deciding if enabling checkout or not. When the printer identifies that auto checkout is needed, two or three labels shall be fed for checkout.
- [Relevant command] <STX>Jb

STX Jb Enable/disable auto checkout function

- [Function] This command can enable/disable auto checkout function. Because it is not saved in EEPROM, this command is not available after power off suddenly.
- [Data format] <STX>Jbn
- [Value range] n=1 disable auto checkout function.
 n=0 enable auto checkout function.
- [Relevant command] <STX>JB

STX JC Enable checkout by hand

[Function] This command can enable checkout function.

[Data format] <STX>JC

[Notes] After this command is sent, the printer starts to feed paper and checkout paper.

STX JD Self-test page / LED language settings

[Function] This command can set the self-test page print and LED language display which shall be saved in EEPROM and not lost when power off suddenly.

[Data format] <STX>JDn

[Value range] n=1 its setting is English.
n=0 its setting is Chinese.

[Notes] Some printers' LED don't support Chinese display. This command doesn't function on those printers' display.

STX JE Enable/disable Error and reprint

[Function] This command can enable/disable Error and Reprint function, which is saved in EEPROM. It shall not be lost when power off suddenly.

[Data format] <STX>JEn

[Value range] n=1 Enable Error and Reprint function.
n=0 Disable Error and Reprint function.

[Notes] Error and Reprint function, namely when the printer alerts with error in print (such as Printhead open, paper end, ribbon end), it shall reprint the error label after removing the error.

STX JG Enable/disable image print in hand checkout

[Function] This command can enable/disable image print in hand checkout, which is saved in EEPROM. It shall not be lost when power off suddenly.

[Data format] <STX>JGn

[Value range] n=1 Enable the image print in checkout by hand.
n=0 Disable the image print in checkout by hand.

[Notes] After this function is enabled, the printer shall print the voltage wave chart obtained by current paper mark sensor at the time of checkout by hand.

STX JZ Enable/disable buzzer alarm

[Function] This command can enable/disable buzzer alarm, which is saved in EEPROM. It shall not be lost after power off suddenly.

[Data format] <STX>JZn

[Value range] n=1 Enable buzzer alarm function.
n=0 Disable buzzer alarm function.

STX JY Adjust Printer Vertical Position

[Function] This command can adjust vertical coordinate at y0 in printing label.

[Data format] <STX>JYsnnnn

- [Value range] • s: Positive value doesn't need '+', and negative value needs '-'
 • nnnn: 2 bit digit between 0000~9999. unit:Dot, mm/10, inch/100

[Notes] When the adjustment is positive, the print position leans to retraction orientation. when it is negative, the print position leans to ejection orientation.

STX Js Set sensor positioning mode

[Function] Set sensor positioning mode

[Data format] <STX>Jsm

[Value range] m: Use the leading edge of gap to position when it is 0, and use the trailing edge of gap to position when it is 1.

[Default] Use the leading edge of gap to position.

[Notes] This command is used for label paper positionin. Usually, the positioning method will not be changed, or it will change the value of EEPROM.

STX JJ Set Japanese addressing mode

[Function] Set Japanese addressing mode

[Data format] <STX>JJm

[Value range] m: Mode value is 0 when m is 0; mode value is 1 when m is 1.

STX K Extended System Commands

[Function] This command instructs printer to execute extended system commands.

[Data format] <STX>K

[Notes] For details, please see Extended-System Commands Chapter.

STX k Test RS-232 port

[Function] This command instructs the printer to transmit the character Y from the printer's RS-232 port.

[Data format] <STX>k

[Notes] The host should receive a Y character under normal serial status.

STX L Enter Label-Formatting Command

[Function] This command shifts the printer to the label-formatting mode.

[Data format] <STX>L

[Notes] Once in this mode, the printer expects to respond to field record definition and lable-formatting command only, all system-level commands and extended system commands will be ignored until command E, e, X or s is received. See label-formatting commands for additional information.

STX I Set mirror image print

[Function] This command shifts the printer's printing mode between mirror image and normal image.

[Data format] <STX>I

[Default] Non-image printing mode after turn on the printer.

[Example]



[Relevant command] M

STX M Set Maximum Label Length

- [Function] This command informs the printer of the maximum distance within which to search for a label's edge (registration hole/mark) after ending non-continuous paper print without paper mark.
- [Data format] <STX>Mnnnn
- [Value range] nnnn:4 digits between 0000~9999 used to specify the length. unit: dot, mm/10, Inch/100.
- [Default] 300mm
- [Notes] The minimum value should be 75mm and the default value is 300 mm.
- [Example] <STX>M1000 Take mm/10 as the unit, the maximum distance within which to search for a label's edge (registration hole/mark) is 100mm.

STX m Set Printer to Metric

- [Function] This command sets the printer to measure in metric (mm/10).
- [Data format] <STX>m
- [Notes] After this command is sent, all measurements will be interpreted as metric values until the printer is set to another measurement unit or the printer is turned off.
- [Relevant command] m

STX N Set Printer to Dots

- [Function] This command sets the printer to measure in dots.
- [Data format] <STX>N
- [Notes] After it is sent, all measurements will be interpreted as dots values until the printer is set to another measurement unit or the printer is turned off. The value in inches or millimeter corresponding to one dot varies with the different resolutions of the printhead. (For 203DPI, the metric value corresponding to one dot is 0.125 mm. for 300DPI that of each dot is 0.0847mm).
- [Relevant command] N

STX n Set Printer to Inches

- [Function] This command sets the printer to measure in inches (inches/100).
- [Data format] <STX>n

[Notes] After this command is sent, all measurements will be interpreted as inch values until the printer is set to another measurement unit or the printer is turned off.

[Relevant command] n

STX o Cutter test

[Function] When this command is sent, the cutter unit shall immediately make a cut.

[Data format] <STX>o

[Notes] It is used to test whether the cutter unit is working normally.

STX p Controlled Pause

[Function] This command causes the printer to pause.

[Data format] <STX>p

[Notes] the controlled pause command causes the printer to pause only after all previous commands of <STX>p are executed. This pause is often useful between batches of labels. Commands sent to the printer after the controlled pause command can still be executed. But for label formatting commands, after having executed the commands, the printer does not print until one of the followings happens:

- The printer receives the command <SOH> B;
- The PAUSE button on the front panel of the printer is pressed.

[Relevant command] <SOH>B

STX Q Clear All Modules

[Function] This command instructs the printer to clear all of the Flash, Ram and internal Modules including label formatting files, character set files and images files.

[Data format] <STX>Q

STX q Clear specified Module

[Function] This command clears the specified memory module (Flash or RAM) including label formatting files, character set files and image files will be removed.

[Data format] <STX>qa

[Value range] a: A or B,specified module

[Example] <STX>qA

STX r Select Reflective Sensor

[Function] This command selects the reflective sensor for label detection, which is used for the Medias with different reflection rate such as black mark.

[Data format] <STX>r

[Notes] The sensor specifies the top-of-form based on the the start of black mark identified. After one print task is finished, this command setting is saved in EEPROM.

STX S Set Feed Rate

[Function] This command sets the speed that the printer will Feed media.
 [Data format] <STX>Sn
 [Value range] n: A ~T (See "Speed comparison table")
 [Relevant command] P

STX s Set Printer to Single Buffer Mode

[Function] This command instructs the printer to print a dot pattern test label.
 [Data format] <STX>s
 [Notes] Comparing to double buffer mode, the printer is able to print a larger label in this mode.

STX T Printhead Dot Pattern Test Label

[Function] This command instructs the printer to print a dot pattern test label.
 [Data format] <STX>T
 [Notes] This command prints the same dot pattern as powering on the printer with the "Feed" button held down (self-test mode), but the printer will not print a configuration label. To view the full test pattern, please use the media as wide as the printhead, which should be over 60mm.

STX t Test RAM Module

[Function] This command tests all RAM modules. The printer returns a one-line message stating the tested module is good or bad.
 [Data format] <STX>t
 [Notes] These command defaultilly test bases RAM and extended RAM. After the RAM test, the printer is reset automatically by powering off/on.
 [Example] STX>t
 Printer response: MODULE:1 2048K GOOD<CR>
 MODULE:2 xxxxK results <CR>
 results: GOOD / BAD
 xxxx: 128/256/512/2048
 If no extended RAM is installed, the printer will return:
 MODULE: 2 NOT INSTALLED<CR>

STX U Label Format Field Replacement

[Function] This command replaces the data in format filed with new data.
 [Data format] <STX>Unnss...s<CR>
 [Value range]

- nn: The format field number, 2 digits between 01 and 99.
- ss...s :The field data
- <CR>:Carriage return character.

 [Notes] The new data string must equal the original string length and contain valid data. To easily keep track of fields, put all of the fields to be updated with the command at the beginning of the label format. A maximum of 99 format fields can be updated and the fields are numbered consecutively from 01 to 99 in the order in which they are received. This command effects

only to the current format field and will do nothing to the recalled format fields. This command is used in conjunction with the command <STX>G.

Attention: In label format, font supports: 0~9; barcode supports:A~T,a~z;F graphic supports:Y

[Example] “This is BAR_A” in the first label is replaced as “This is bar_a” in the second label, and “0123456” barcode is replaced as “6543210” barcode:

```
<STX>L<CR>
N<CR>
121100000050005This is BAR_A<CR>
1A42000020003200123456<CR>
E<CR>
<STX>U01This is bar_a<CR>
<STX>U026543210<CR>
<STX>G
```

[Relevant command] <STX>G

STX u Rotary Printing On/Off

[Function] This command shifts the label printing mode between rotary printing and normal printing.

[Data format] <STX>un

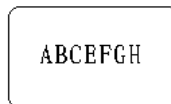
[Value range] n: ‘0’ Switch off 180 degree rotary printing
 ‘1’ Switch on the rotary printing.

Ignored: shift between rotation and non-rotation.

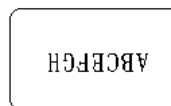
[Default] Non-rotation when turning on the printer.

[Example] <STX>u

Normal



Rotation



STX v Printer’s Firmware Version Information

[Function] This command causes the printer to respond by sending a version string. The version may be different for different printers. The string is ended with a carriage return.

[Data format] <STX>v

[Example] <STX>v

Printer response: BPLA V10.033 03/27/2005<CR>

STX W Request Memory Module Information

[Function] This command requests a directory list for memory module(s).

[Data format] <STX>Wa

[Value range] a: F: Font data
 G: Graphic data
 L:Format data

Printer response:
 SAVED XXXX FILE:
 MODULE:RAM
 filename1
 filename2

 AVAILABLE BYTES IN MODULE:nnnnnnnn<CR>

MODULE:FLASH
 Filename3
 Filename4

 AVAILABLE BYTES IN MODULE:nnnnnnnn<CR>
 XXXX: File type(FORMAT,IMAGE,FONT)
 nnnnnnnn:Available bytes of free space

[Notes] Although a module can store font, graphics and format data together, it can display only one type of information at a time. If the module contains all three types of data, it will be necessary to check the directory three times using each of the control parameters F, G and L to determine its contents and free memory size.

STX w Test Flash Memory Module

[Function] This command performs a test sequence on flash memory modules. However, the time for each test will vary depending on the size of the module.

[Data format] <STX>w

[Notes] The module must have the writing protect switch "off" for testing. The printer responds with a list of 16 characters representing the report data. If only p's and v's are returned, all programmed data has been verified and the Flash Module is good. A indicates a definite memory error and ? indicates that a hardware problem exists. The problem could be on a module or the interfacing hardware.

[Example] <STX>w
 Printer response:eeeeeeeeeeeeeeee or
 ppppppppvvvvvvvv or
 ????????????????

STX X Set default module

[Function] Set default module.

| | |
|--------------------|--|
| [Data format] | <STX>Xm<CR> |
| [Value range] | m: A or B,specified module. |
| [Notes] | Set the specified module as the system default module. |
| [Relevant command] | STX>x |

STX x Delete File from Module

| | |
|---------------|---|
| [Function] | This command removes a specific file from the specified module. |
| [Data format] | <STX>xmntnn...<CR> |
| [Value range] | <ul style="list-style-type: none"> m: A or B, specified module t:File type <ul style="list-style-type: none"> 'G': Graphic file type 'L': Label format file type 'F': Font file type nn...n:The file name to be deleted is up to 8 characters. |
| [Notes] | The file name will be removed from the module directory and the space occupied by the actual file data will be release. (But for Flash module, the actual data space will not be released). |

STX Y Output Sensor Vaule

| | |
|---------------|---|
| [Function] | This command causes the printer to respond with the current sensor value status including paper mark sensor, label in sensor, printhead position sensor and ribbon sensor values. |
| [Data format] | <STX>Y |
| [Example] | <pre><STX>Y Printer response: paperflag:ADC nnnn/xxxx<CR> exist ADC:nnnn/xxxx<CR> headpos ADC:nnnn/xxxx<CR> ribbon ADC:nnnn/xxxx<CR> nnnn is the current value while xxxx is the corresponding standard judgement value.</pre> |

STX Z Print Internal Information and Dot Pattern

| | |
|---------------|--|
| [Function] | This command prints internal configuration of the printer and the dot pattern test labels. |
| [Data format] | <STX>Z |
| [Notes] | The results are same as performing the power up self-test. In order to be sure all of the information will fit, use the labels as wide as the printhead and at least 260mm long. |

STX z Pack Module

| | |
|---------------|---|
| [Function] | This command causes the printer to reclaim all storage space associated with all deleted files on the specified module, so that the non-continuous free space becomes a continuous free space. (FLASH module cannot be packed). |
| [Data format] | <STX>zm |
| [Value range] | <ul style="list-style-type: none"> m: A The module selection(Only RAM can be packed) |

*** Explanatory Line**

- [Function] This command instructs the printer to ignore current data message between * and <CR>.
- [Data format] ASCII * data<CR>
 Hex 2A data<CR>
 Decimal 42 data<CR>
- [Value range] • data:Explanatory character string.
 • <CR>:Carriage return character.
- [Notes] This is useful when inputing necessary explanatory notes.

EXTENDED-SYSTEM COMMAND <STX>K

Extended-system commands are the extended sections of system command which offers extra printer control and are issued in contexts as same as system format. Most extended-system commands save its set values in EEPROM, so as to reconfigure printer when printer start up next time.

| Command character | Function |
|-------------------|-------------------------------------|
| <STX>K | Printing offset adjustment |
| <STX>K D | Software-DIP switch setting |
| <STX>K f | Paper out offset adjustment |
| <STX>K m | Set Max length of label calibration |
| <STX>K M | Memory configuration |
| <STX>K Q | Memory configuration inquiry |
| <STX>K R | Reposition memory configuration |
| <STX>K S | Set size of system buffer |
| <STX>K W | Print buffering width configuration |
| <STX>Kw | Set print buffering width |

Table 2-16

STX K Printing offset adjustment

- [Function] When this command applies to print on non-continuous paper, it adjusts space between printing start position and black mark.
- [Data format] <STX>Ksnn
- [Value range] • s:No '+' for positive number, negative with '-'.
 • nn:Two digits figure between 00~99. unit: dot, millimeter/10, inch/100.

STX KD Software DIP switch setting

- [Function] With similar function as DIP, this command controls printer's environment. Configuration informations take effect when printer is restarted, which could be saved in EEPROM permanently.
- [Data format] <STX>KDammnn<CR>
- [Value range] • a:0,1,2,3,4 is specified as DIP switch to be changed, details in Table 2-17~table 2-21.
 • mm:two-digit Hex figure specifies the bit to be changed (1 change, 0 not change). When a= '0', mm is invalid.
 • nn:two-digit Hex figure specifies the value of bit to be changed,and no change about value of the bit not specified.
 • <CR>:Carriage return character.
a='0'

| DIP0 | Function | Discription |
|-----------------|-----------|--|
| 0-9 (figure) | Baud rate | 0=9600, 1=110, 2=300, 3=600, 4=1200, 5=2400, 6=4800, 7=9600, 8=19200, 9=38400 |

Table 2-17

a='1'

| DIP1 | Function | Discription |
|------|-------------|--|
| 0 | Reserve | |
| 1 | Reserve | |
| 2 | Reserve | |
| 3 | Stop bit | 0=1 stop bit, 1=2 stop bits |
| 5,4 | Parity | 00=no, 10=odd checking, 11=even checking |
| 6 | Data bit | 0=8 bit, 1=7bit |
| 7 | handshaking | 0=hardware handshaking, 1=software handshaking |

Table 2-18

a='2'

| DIP2 | Function | Description |
|------|----------------------------|---|
| 0 | Reserve | |
| 1 | Symbol confirmation mode | 0= Yes, 1=No |
| 2 | Reserve | |
| 3 | Successive field buffering | 0=double buffering, 1=single buffering |
| 5,4 | Paper present mode | 00=cutter, 01=peel off, 10=tear off, 11= rewind |
| 6 | Paper type | 0=marked paper, 1=continuous paper |
| 7 | Printing method | 0= thermal, 1=thermal transfer |

Table 2-19

a='3'

| DIP3 | Function | Description |
|------|-------------------------------|----------------------|
| 1,0 | Unit | 00=mm,01=inch,10=dot |
| 2 | Enable Immediate command | 0=enabled,1=disabled |
| 3 | Enable auto status return | 0=Disabled,1=Enabled |
| 4 | Panel lock button | 0=Unlocked,1=Locked |
| 5 | Auto paper feed when start-up | 0=Disabled,1=Enabled |
| 6 | Syntax check | 0=Yes,1=No |
| 7 | Serial communication check | 0=Yes,1=No |

Table 2-20

a='4'

| DIP4 | Function | Description |
|------|---------------------------|----------------------------|
| 0 | Reserve | |
| 1 | Test page font | 0=Chinese,1=English |
| 2 | Reserve | |
| 3 | Label sensor installation | 0=Installed, 1=uninstalled |
| 4 | Reserve | |
| 5 | Reserve | |
| 6 | Reserve | |
| 7 | Reserve | |

Table 2-21

[Example] Command <STX>KD00009<CR> set baud rate of serial interface as 38400.

Command <STX>KD23020<CR> set paper present mode as tear off.

[Relevant command] <STX>j

STX Kf Paper present offset adjustment

[Function] This command adjust paper present distance after label printing,

[Data format] <STX>Kfsnn

[Value range] s: no '+' for positive number, with '-' for negative.

nn: two-digit figure between 00~99. Unit: dot, mm/10, inch/100.

[Notes] This command is effective under tear off, peel out and cutter mode. Under the rewind mode, no paper is presented after printing and without offset adjustment.

[Relevant command] STX>K

STX Km Set Max. length of checkout label

[Function] This command set label feed length in label checkout.

[Data format] <STX>Kmnenn

[Value range] nenn:4-digit figure between 0000~9999. Unit: dot, mm/10, inch/100.

[Notes] When set length is less than actual used label length, the checkout may fail. The 2.5~3 times of actual label length is suggested.

STX KM Memory configuration

[Function] This command specifies printer internal RAM (including standard RAM and all optional RAM installed).

[Data format] <STX>KMx [:iy][:jz]<CR>

- [Value range] • l, j are S,W respectively.
- x, y, z are 4-digit decimal figure in 1KB memory block, dots, inches/100 or mm/10 and are separated by the colon(:). Brackets indicate optional fields.
- M to be expanded
- S set the system buffer area size. 4-digit decimal figure following S in 1KB specifies system buffer size with Minimum size is 32KB. If the allocated memory size is less than 32KB, the printer will defaultly take 32KB as the system buffer area size.
- W set effective printing width (i.e: print buffer width). if it does not appear, the current printing width shall not change. 4-digit decimal figure that follows W specifies print buffer width in dots, mm/10 or inches/100. (In case of dot value, the printer automatically takes the integer part of the result of the number divided by 8). If the numerical value specified exceeds the printhead width, the effective printing width is set as the same as printhead width. If the numerical value specified is less than the allowable minimum value (144dpi), then the effective printing width is set to the allowable minimum value.
- Only one field of M, S or W is required, any two fields are separated with colon (:). Label print buffer may be calculated in bytes (label length * print buffer width * printhead resolution/8). For example, if the label length is 100 dots, print buffer width is 50 mm and the resolution is 8 dots per mm, then the label print buffer shall be $100 \times 50 \times 8 / 8 = 5000$ bytes.
- [Notes] It provides method to manage printer internal memory configuration, Memory can be assigned to specific entities of functions in units of 1KB blocks. The configuration is stored in EEPROM and is reconfigured upon power on or reset of the printer. If the requested memory allocation exceeds the configurable memory available, the command will be rejected and the printer will assume the default memory configuration.
- The memory allocation(s) by this command that shares the same memory with print buffer will inevitably affect maximum print length, as well as throughput. Use query memory configuration command <STX>KQ to see the configurable memory size.

STX KQ Query Memory Configuration

- [Function] This command causes the printer to transmit its internal RAM memory configuration to the host.
- [Data format] <STX>KQ
- [Notes] The transmitted data provides information as to the total amount of internal RAM installed, the total amount of available memory for configuration and the amount of memory currently assigned to specific module or entities.
- [Example] <STX>KQ
- Printer return format:
- INTERNAL MEMORY<CR>
- VER: BPLA V10.033 03/27/2005<CR>
- INSTALLED: iii<CR>
- AVAILABLE: vvv<CR>

MODULE:B: xxxx<CR>
 SYSTEM: ssss<CR>
 LABEL MEM: LLLL<CR>
 LABEL SIZE: 9999:DOT<CR>
 LABEL BUFFER WIDTH SIZE: wwwwBYTE<CR>

<CR>: ASCII 0x0d carriage return character

VER: BPLA V10.033 03/27/2005 :character string that represents the firmware version number.

iiii: Capacity of installed internal RAM memorizer (in 1KB unit)

vvvv: Available capacity of internal RAM memorizer (in 1KB unit)

xxxx: Available capacity of mode B momerizer (in 1KB unit).

If it is not installed, then printer responds NOT INSTALLED.

ssss: Capacity of internal RAM memorizer assigned to system buffer (in 1KB unit)

LLLL: Capacity of internal RAM memorizer assigned to print buffer (in 1KB unit)

9999: Current printable length (in dot unit)

wwwv: Current print buffer width

STX KR Reset memory configuration

[Function] This command resets the printer's internal RAM memory configuration (print buffer width and system buffer size) to default settings. This command also resets EEPROM

[Data format] <STX>KR

STX KS Set system buffer size

[Function] Set system buffer size.

[Data format] <STX>KSx

[Value range] See <STX> KM

STX KW Print buffering width configuration

[Function] Print buffering width configuration.

[Data format] <STX>KWx

[Value range] See <STX> KM

STX Kw Set print buffer width

[Function] This command set a valid printing width (i.e, print buffer width).

[Data format] <STX>Kwnnnn<CR>

- [Value range]
- nnnn: The 4-digit decimal figure between 0000~9999 is in unit of dot, mm/10 or inch/100.
 - <CR>: Carriage return character.

Label format command

Command <STX> L make printer shift from system command to label format command mode. All followed commands are label format command. The label format commands shall be effective only on the current label.

Under label format commands mode, the default parameter values are as follows. Format Attribute is in XOR mode, the measurement unit is what specified by system-level command, quantity and paper presenting unit is 1, row or column offset is 0, character space is 0, none mirror-image, emulation dot width and height is 1*1,0 is expressed in 0,and the global register is all cleared.

| Command | Function |
|---------------------|---|
| <u>+</u> | Makes last field entered increment numeric |
| <u>-</u> | Makes last field entered decrement numeric |
| <u>></u> | Makes last field entered increment alphanumeric |
| <u><</u> | Makes last field entered decrement alphanumeric |
| <u>^</u> | Set Count By Amount |
| <u>&</u> | Set Increment/Decrement Filed |
| <u>:</u> | Set Cut By Amount(4-Digit) |
| <u>A</u> | Set Format Attribute |
| <u>C</u> | Set Column Offset Amount |
| <u>c</u> | Set Cut By Amount(2-Digit) |
| <u>D</u> | Set Width and Height Dot Size |
| <u>E</u> | Terminate Label Formatting Mode and Print Label |
| <u>e</u> | Terminate Label Formatting Mode and Print Label(Without paper presenting actions) |
| <u>G</u> | Place Data to Global Register |
| <u>g</u> | Set Character Space |
| <u>H</u> | Set Print Darkness |
| <u>M</u> | Select Mirror Mode |
| <u>m</u> | Set Metric Mode |
| <u>N</u> | Set Dot Mode |
| <u>n</u> | Set Inch Mode |
| <u>P</u> | Set Print Speed |
| <u>p</u> | Set Label Back Speed |
| <u>Q</u> | Set Quantity of Labels to be Printed |
| <u>R</u> | Set Row Offset Amount |
| <u>r</u> | Recall Stored Label Format |
| <u>S</u> | Set Paper Feeding Speed |
| <u>s</u> | Store Label Format in Module |
| <u>T</u> | Set Field Data Line Terminator |
| <u>t</u> | Set Layout |
| <u>X</u> | Terminate Label Formatting Mode without printing |
| <u>z</u> | Zero (θ) Conversion to "0" |
| <u><STX>S</u> | Recall Data from a Specified Global Register |
| <u><STX>T</u> | Real-time clock printing |
| <u>*</u> | Explanation Line |
| <u>#A</u> | Set English fonts code |
| <u>#B</u> | Set column offset for English against Chinese |
| <u>#Q</u> | Clear assigned area of label |

Table 2-22

+(>) Make Last Field Entered Increment Numeric (Alphanumeric)

[Function] This command causes the printer to automatically increment fields in a batch of labels.

[Data format] +(>)ii<CR>

- [Value range]
- ii:2 digits between 00 and 99.
 - <CR>: Carriage return character

[Notes] When this command is used to print labels numbered in sequence, the data in the field will increment by the value after the plus sign (+) each time a label is printed. The + character

may be replaced by a > character to make the field increment alphabetically rather than numerically. This command has effect only on the label-format record that it follows. For field increment alphabetically, the maximum length of characters in the field shall not exceed 6 bits .while for field increment numerically, the maximum length of numbers in the field shall not exceed 9 bits. The printer identifies increment/decrement part by searching for successive numbers (characters) from the end symbol to the start of the field. If the length of numbers or characters exceeds the bits allowed, the exceeded part will not be handled.

[Relevant command] &

-(<) Make Last Field Entered Decrement Numeric (Alphanumeric)

[Function] This command causes the printer to automatically decrement fields in a batch of labels.

[Data format] -(<)ii<CR>

- [Value range]
- ii :2 digits between 00 and 99.
 - <CR>:Carriage return character.

[Notes] This command is useful when printing labels that are numbered in sequence. The data in the field will decrement by the value after the minus sign each time a label is printed. The minus character may be replaced by a < character in order to make the field decrement alphabetically rather than numerically. This command has effect only on the format record that it follows.

[Relevant command] &

^ Set Count by Amount

[Function] This command shall set the print quantity of same label in successive field.

[Data format] ^nn<CR>

- [Value range]
- nn :2 digits between 00 and 99.
 - <CR>: Carriage return character.

[Default] If default this command, then system default printing volume as 1 piece for same label.

[Notes] This command can only be sent once per label format and has no effect on the recalled FORMAT settings.

& Set Increment/decrement Field

[Function] This command is used to set the increment/decrement field.

[Data format] &mmnn<CR>

- [Value range]
- mm: two bits decimal digits used to specify the start point of the increment/decrement field. The start point is defined as the first digit of successive numbers or characters founded while searching from the end to the start of the field.
 - nn: two bits decimal digits used to specify the length of the increment/decrement field. nn means that only the forgoing nn bits from the start point (include the start point) are valid digits
 - <CR> :Carriage return character

[Example] Print 10 piece labels in increment/decrement filed. Figure 100000 increases by 99 in turns, Alphanumeric ABCDEFG decrement is 3 alphanumeric from G. That is: first label 100000, ABCDEFG. second label 100099,ABCDEFD. third label 100198, ABCDEFA. forth label 100297, ABCDEEX...tenth label 100891, ABCDEEF.

```
<STX>c0400<CR>
<STX>L<CR>
121100000100020100000<CR>
&0006<CR>
+99<CR>
121100002000020ABCDEFG<CR>
&0006<CR>
<03<CR>
Q0010<CR>
E<CR>
```

: Set Cut By Amount(4bits)

[Function] This command is used to set the number of labels to be printed before a cut/peeling off/tearing off is made.

[Data format] :nnnn<CR>

[Value range] • nnnn :4 digits between 0001 and 9999
 • <CR> :Carriage return character

[Default] System default 1 piece paper out

[Notes] This command allows a predetermined number of labels to be printed before a cut/peeling off/tearing off is made. This feature is useful when it is necessary to print an uncut strip of labels. Between 0001 and 9999 labels may be printed before a cut/peeling off/tearing off is made. The amount must be smaller than the quantity of labels printed.

[Relevant command] c

A Set Format Attribute

[Function] This command specifies the type of format operation.

[Data format] An<CR>

[Value range] n:is either 1, 2, 3 or 4.

1: XOR Mode
 This is the default mode .where text strings, images or barcodes intersect will not be printed.

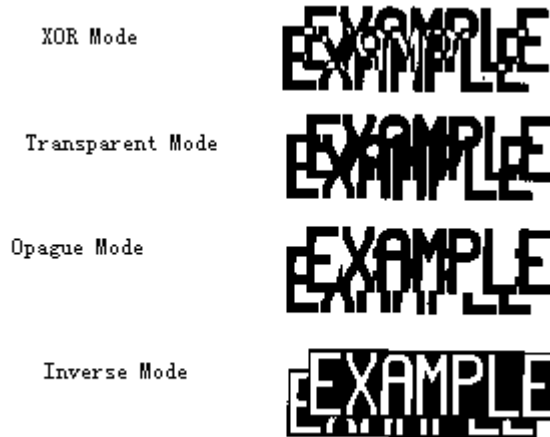
2: Transparent Mode
 This optional mode allows the intersection of text strings, images and barcode to be printed.Therefore, it allows users to over print a field on another field.

3 : Opaque Mode

Interacting text is obliterated by the text formatted last, each character cell is treated as opaque.

4 : Inverse Mode

This mode allows inverse (white on black) printing.



- <CR> : Carriage return character.

[Default] When font smooth enlargement function being closed, system default Format Attribute as XOR mode.

[Notes] This command specifies the type of format operation and remains in effect until another format command is specified or another label format has begun. When font smooth enlargement function open(see<STX>:),Only support transparent mode while printing under font enlargement function. The recalled format attribute has no effect on the caller attribute and the format attribute setting will not act on barcode and its explanations. To prevent overwriting the barcode, it is recommended to place barcode creating records at a retral position.

C Set Column Offset Amount

[Function] This command allows horizontal adjustment of the point where printing begins.

[Data format] Cnnnn<CR>

- [Value range]
- nnnn :4 digits between 0000 and 9999 in dots, mm/10, inches/100.
 - <CR> :Carriage return character.

[Default] System default for column offset is 0.

[Notes] This command instructs the printer to print label formats nnnn units to the right of the position that the format specifies (shall not exceed print buffer width). This command has no effect on recalled format.

c Set Cut by Amount(2bits)

[Function] This command is used to set the number of labels to be printed before a cut/peeling off/tearing off is made.

[Data format] cnn<CR>

- [Value range]
- nn :2 digits between 01 and 99.

- <CR> :Carriage return character.

[Default]

System default 1 piece paper out

[Notes]

This command functions the same as the “.”command except that only a two digit value can be entered. This command allows a predetermined number of labels to be printed before a cut/peeling off/tearing off is made. This feature is useful when it is necessary to print an uncut strip of labels, you may print 01 to 99 labels before a label is presented. This value must be smaller than the quantity of labels printed.

[Relevant command] :

D Set Width and Height of Dot

[Function]

Not available.

E Terminate Label Formatting Mode and Print Label

[Function]

Terminate label formatting mode and print a label.

[Data format]

E<CR>

[Value range]

<CR> :Carriage return character.

[Notes]

When the printer is processing label-formatting commands and receives an “E” command, it will immediately terminate label formatting mode and print a label based on the data it has received. If no printable data has been received, the printer will not perform printing. Command sent after command “E” must be non label format command. Label format command after command “E”, and before “<stx>L” will be treated as command usage error.

[Relevant command]STX>L

e Terminate Label Formatting Mode and Print Label (without paper presenting actions)

[Function]

Terminate label formatting mode and print a label (will not do any paper presenting action).

[Data format]

e<CR>

[Value range]

<CR> :Carriage return character.

[Notes]

This command functions the same as the “E” command except that the printer will not do any paper presenting actions when having printed the last character. It is useful when printing a big label format which consists of too much information to be buffered in a lump. User may divide the label format into several sub-label formats and then integrate them together when printing by using this command.

G Place Data to Global Register

[Function]

Place data to global register.

[Data format]

Gn<CR>

[Value range]

- n:A~P register name incrementing in alphabetic seriation.
- <CR> :Carriage return character.

[Notes]

This command is sent to the printer following a print format record and the print data in the format record is place in a global register. This data may be retrieved and copied in another record in the same label format by using the special label-formatting command <STX>S.

Global register are named in the order received, beginning with register A and ending at register P. When existing format record works, every level format record being independent Global Register.

g Set Character Space

[Function] This command is used to set the character space for a label format.

[Data format] gsnn<CR>

[Value range] • s: When the value is negative, the minus sign '-' is necessary. When the value is positive, the plus sign '+' may be omitted.

• <CR> :Carriage return character.

[Default] System default character space as 0.

[Notes] This command is used to set the character space for a label format and the value is always valid until another value is selected or another label format is started. The character space of the recalled label format will has no effect on the caller's character space. The character space value will not be applied to barcode and explanation lines.

H Set Print Darkness

[Function] This command is used to set the print darkness by changing the "on time" of dots on the printhead.

[Data format] Hnn<CR>

[Value range] • nn:2 digits between 00 and 30

• <CR> :Carriage return character.

[Notes] This command has no effect on the recalled format. The valid setting range is 00 to 30.

M Select Mirror Mode

[Function] This command instructs the printer to MIRROR all printable field record followed.

[Data format] M<CR>

[Value range] <CR> :Carriage return character.

[Default] System default non mirror mode.

[Notes] This command switches the printer between mirror mode and normal mode and the setting is valid until another mode is selected or a new label format is started. The mirror mode of the recalled format has no effect on the caller's mirror mode. The mirror mode can not be applied to barcode and explanation lines.This command only MIRRORS the field record followed while the <STX>I command MIRRORS the whole label format.

[Relevant command] <STX>I

m Set Metric Mode

[Function] This command sets the printer to measure in metric(mm/10).

[Data format] m<CR>

[Value range] <CR> :Carriage return character.

[Default] System default metric mode.

[Notes] This command sets the printer to measure in metric(mm/10) and the setting is always valid until the printer is set to another measurement unit or the current label format ends. The measurement unit of the recalled format has no effect on the caller. Metric mode is the default setting of a label format.

[Relevant command] STX>m

N Set Dot Mode

[Function] This command instructs the printer to measure in dots.

[Data format] N<CR>

[Value range] <CR> :Carriage return character.

[Default] System default metric mode.

[Notes] This command instructs the printer to measure in inches and the setting is always valid until the printer is set to another measurement mode or the current label format is ended. The measurement unit of the recalled format has no effect on the caller.

[Relevant command] STX>N

n Set Inch Mode

[Function] This command instructs the printer to measure in inches (inch /100)

[Data format] n<CR>

[Value range] <CR> :Carriage return character.

[Default] System default metric mode.

[Notes] This command instructs the printer to measure in inches and the setting is always valid until the printer is set to another measurement mode or the current label format is ended. The measurement unit of the recalled format has no effect on the caller.

[Relevant command] <STX>n

P Set Print Speed

[Function] This command is used to set a print speed for a label or batch of labels.

[Data format] Pa<CR>

[Value range] a:A~T (See "Speed comparison table").
 <CR> :Carriage return character.

[Notes] This setting has no effect to the recalled format.

[Relevant command] <STX>S

p Set Paper Back Speed

[Function] With this command, user may specify the rate at which the printer rewinds the label to align with the start point of the print position.

[Data format] pa<CR>

[Value range] • a:A~T (See "Speed comparison table").
 • <CR> :Carriage return character.

[Notes] This command is used for peel off/tear off or cut label operation. This command has no effect to the recalled format.

[Relevant command] P,<STX>S

Q Set Quantity of Labels to be Printed

[Function] This command is used to set the number of label copies to be printed.

[Data format] Qnnnn<CR>

- [Value range]
- nnnn:4 digits between 0001 and 9999.
 - <CR> :Carriage return character.

[Default] System default total printing volum as 1 piece.

R Set Row Offset Amount

[Function] Set Row Offset Amount.

[Data format] Rnnnn<CR>

- [Value range]
- nnnn:4 digits between 0000 and 9999 in dots, mm/10 or inches/100.
 - <CR>:Carriage return character.

[Default] System default row offset as 0.

[Notes] This command allows vertical adjustment of the point where printing begins. The valid data shall be between 0000 and 9999 and not exceed the label length. This command has no effect on the recalled format.

r Recall Stored Label Format

[Function] This command is used to retrieve entire label formats that have been stored on a memory module.

[Data format] rnnnnnnnn<CR>

- [Value range]
- nnnnnnnn:The name of recalled FORMAT,up to 8 characters.
 - <CR> :Carriage return character.

[Notes] The printer will search for the specified format at a certain sequence in the internal available memory module.BPLA allows up to seven formats to be recalled.

[Relevant command] s

S Set Paper Feeding Speed

[Function] This command sets the rate at which the printer to feed printed labels.

[Data format] Sa<CR>

- [Value range]
- a:A~T (See “speed comparison table“).
 - <CR> :Carriage return character.

[Notes] This command has no effect on the recalled format.

s Store Label Format in Module

[Function] This command store label format in appointed module.

[Data format] sannnnnnnn<CR>

- [Value range] • a:A or B,module name of store label format.
 • nnnnnnnn:stored label format file name,not more than 8 characters.
 • <CR> :Carriage return character.
- [Notes] This command will close label format command. When store several label formats, different label format file names are required to be appointe. if stored label formats are in same file name, when transfer through command “ r”, only transfer the first stored label format of same name.
- [Relevant command] r

T Set Field Data Line Terminator

- [Function] This command sets an end symbol for the next field.
- [Data format] Tnn<CR>
- [Value range] • nn:2 bit hex numbers between 00~FF.
 • <CR> :Carriage return character.
- [Default] System default field end character as hex digit 0D (eg.<CR>).
- [Notes] This command sets an end symbol for the next field and the symbol is valid only for the next field.After the next field, The terminator still defaults to a carriage return. This allows users to embed special binary control codes into the data to be printed.

t Set Layout

- [Function] This command is used to select horizontal or vertical layout for the data to be printed.
- [Data format] ta<CR>
- [Value range] • a :1bit number either zero or 1; 0:Horizontal layout; 1:Vertrical Layout.
 • <CR> :Carriage return character.
- [Default] System default horizontal typeset.
- [Notes] This setting is always valid to the current label format until this command is sent again. This command not support vertical layout of barcode, barcode is not allowed to place after this command.

X Terminate Label Formatting Mode

- [Function] This command is used to terminatelabel formatting mode.
- [Data format] X<CR>
- [Value range] • <CR> :Carriage return character.
- [Notes] When the printer is in label-formatting mode and receives an X command, it will immediately switch to the system level command mode and generate a label format based on whatever data it has received. However, it will not print a label.

Z Zero (θ) Conversion to 0

- [Function] This command shifts θ to 0.
- [Data format] z<CR>
- [Value range] • <CR> :Carriage return character.

- [Default] System default printingθ.
- [Notes] This command makes 0-6 size font and 0 in barcode to shift between θ and 0. This command only works towards corresponding format, and applies to all records including font 0-6 and barcode A-Z.

STX S Recall Data from a Specified Global Register

- [Function] Recall Data from a Specified Global Register.
- [Data format] Sn<CR>
- [Value range] • <CR> :Carriage return character.
• n:A~P name of a global register.
- [Notes] • If a label format has defined global registers, data in the global registers can be retrieved by other field record in the label format. When receiving the <STX>Sn command, the printer will recall data from the specified global register and place the data in the filed record. When the FORMAT is recalled, every global register in the FORMAT is independent and is only effective in this format.
• Two dimnentional code no support for global rehister.

STX T Real-time clock printing

- [Function] This command is used to print time and date.
- [Data format] <STX>T<string><CR>
- [Value range] • <string> :See the following table.
• <CR> :Carriage return character.

| Characters | Description | Characters | Description |
|------------|-------------------------|------------|---------------------|
| A | Week day(in number) | vw | 24-hour time format |
| BCD | Day name (in English) | xy | 12-hour time format |
| EF | Month number(in number) | Za | Minutes |
| GHI | Month name(in English) | bc | AM or PM |
| PQ | Day | def | Julian date |
| RSTU | Year | | |

- [Notes] Input command according to the detail format of time and date to be printed; 4 characters of year will be printed if full RSTU is used, the last 2 characters of year will be printed and others are not printed if only TU is used. Separators supports space (" "), comma(","), colon(":"), minus("-"), and bias("/").

[Example]

```
<STX>L<CR>
121100000100010<STX>TBCD GHI PQ, TU<CR>
E<CR>
```

Output from printer

```
FRI OCT 07, 00
```

*** Explanation Line**

- [Function] This command makes current information not be operated as any other system commands.
- [Data format] *data<CR>
- [Value range]
 - data:Explanation strings.
 - <CR>:Carriage return character.
- [Notes] This command mainly acts as an indicator of an explanation line.

#A Set English Font Symbol

- [Function] Set English font symbol.
- [Data format] #Axyyn<CR>
- [Value range]
 - x: 1) When x=0, set interior font, value of ynn range: 000-007.
 - 2) When x=9, English font symbol is based on value of Y.
 - When y=0, set interior font, value of "nn" range: 00-07.
 - When y=P, set interior font, value of "nn" range:06,.08,10,12,14,18.
 - When y=A, set RAM extension font, value of "nn" range: 00~99.
 - When y=B, set FLASH extension font, value of "nn" range:00~99.
 - <CR>:Carriage return character.
- [Notes] This command takes effect when printing Chinese and English mixed typeset, and allow setting English font symbol.
- [Example] #A9B13, that is when printing Chinese and English mixed typeset, set English font as symbol B13 within FLASH.

#B Set English font Offset against Chinese

- [Function] Set English font Offset against Chinese.
- [Data format] #Bsnnn<CR>
- [Value range]
 - s:no "+" for offset in positive direction,with "-" for offset in negative direction.
 - nnn:3 digits among 000~999 unit:dot, mm/10, inch/100.
 - <CR> :Carriage return character.
- [Default] System default English font offset against Chinese as 0.
- [Notes] This command takes effect when printing Chinese and English mixed typeset, and allow column adjustment for English font offset against Chinese among total records. This summation of offset volume and Chinese font ordinate volume should not exceed label height. Setting in transferred Format is inefficient.
- [Example] #B+010,that is when printing Chinese and English mixed typeset, up offset is 1mm(unit: mm/10).

#Q Clear out content in appointed label area (not available)

- [Function] This command is used to clear out comment of appointed area in label.
- [Data format] #Qxxxxyyyylhhhh<CR>
- [Value range] xxxx: Specify abscissa of area beginning point.

yyyy: Specify ordinate of area beginning point.

llll: Specify area width.

hhhh: Specify area height.

- <CR>: Carriage return character.

[Notes] This command is used to clear out contents in appointed area of label. When there is already one generated label in printer RAM, the content in appointed area can be cleared by this command.

[Example] First label:
 STX c0400<CR>
 STX L<CR>
 A2
 131100001000100FONT<CR>
 131100002000100IMAGE<CR>
 131100003000100FORMAT<CR>
 E<CR>
 STX #C1<CR>



clearance symbol for second label "IMAGE",

replace with "LABEL"

STX L<CR>

#Q0100020003000100<CR>

131100002000100LABEL<CR>

E<CR>



Generating Label Formats

This section explains how to use the fields in a print format record. Table below gives an example of a label format as the printer sees it and Figure 3-1 is a label generated from that format. The printer receives the data sequentially, left to right, top to bottom.

| String Sent to Printer | Printer Interpretation |
|--|----------------------------------|
| <STX>L<CR> | Begin a label format |
| n<CR> | Set Inch Mode(inch/100) |
| 121100000050005HOME POSITION<CR> | Format text |
| 191100602000200ROTATION 1<CR> | Format text |
| 291100602000200ROTATION 2<CR> | Format text |
| 391100602000200ROTATION 3<CR> | Format text |
| 491100602000200ROTATION 4<CR> | Format text |
| 1A3104003000260123456<CR> | Format barcode with explanations |
| 4a6210002500140123456<CR> | Format barcode |
| 1X1100000000000B400400003003<CR> | Format box |
| 1X1100002000000L400001<CR> | Format line |
| 1X1100000000200L001400<CR> | Format line |
| 131100004100010The Printer is here<CR> | Format text |
| Q0002<CR> | Number of labels |
| E<CR> | End formatting, begin print |

Note: The lower left corner of the label is defined as the coordinate origin (0,0) in BPLA. The label generated from the above label format is as follows:

THE PRINTER IS HERE

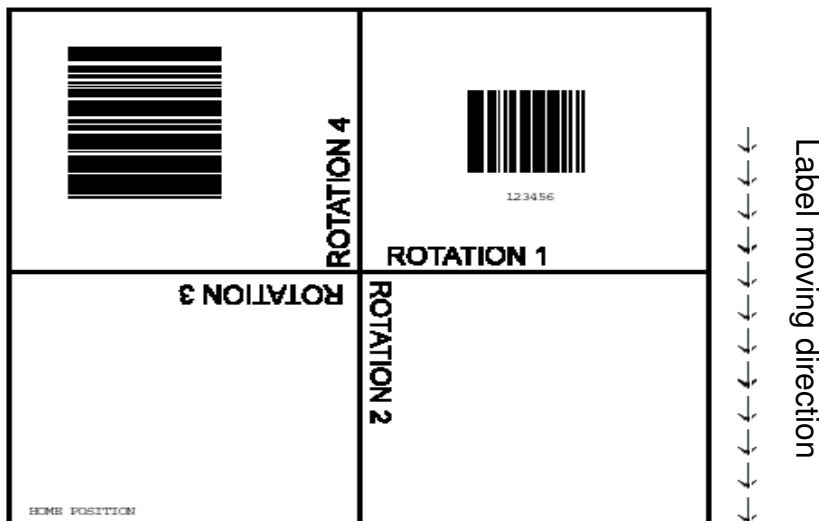


Table 3-1

The first line in the sample format is the system-level command directing the printer to begin label formatting. Other system-level commands may precede the <STX>L for printer setup. Lines 2, 14 and 15 are label formatting commands. Line 15 is the label format ending and printing command. The remaining lines (3-13) are print format records which will be explained in this chapter.

A record is a data string that contains the information to be printed on the labels. Records are the building blocks of label formats and each must end with a termination character (usually a carriage return). Omitting termination characters will result in the concatenation of records. Omitting the carriage return that precedes the termination character E, which is necessary to complete the label formatting and begin printing, will cause the printer to continue interpreting all subsequent data as label print format records.

Generating records

Every record is made of three parts:

- 1) a header that is 15 bytes in length.
- 2) the data to be printed.
- 3) a termination character (e.g. <CR>) that marks the end of the field. The header is used to select the appearance of the data when printed by choosing rotation, font type, and size and position options. Every header contains similar information, but this information may be used in different ways by different types of records.

There are six types of records.

- 1) Internal bitmapped font
- 2) Smooth font
- 3) Vector font
- 4) Barcode
- 5) Images
- 6) Graphics

Structure of a record

The basic structure of the record is described below. Details for the various interpretations of the six types will be given later.

The third line of the label format example in the above table consists of the following:

121100000050005HOME POSITION<CR>

This record consists of three basic components as shown below:

| | | |
|-----------------|---------------|-----------------------|
| Header | Data | Termination Character |
| 121100000050005 | HOME POSITION | <CR> |

The record conforms to the following fixed field format(spaces have been added for visual clarity):

| | | | | | | | | | | | |
|---|---|---|---|-----|------|------|---|------|-------|---------------|------|
| 1 | 2 | 1 | 1 | 000 | 0005 | 0005 | | | | HOME POSITION | <CR> |
| a | b | c | d | eee | ffff | gggg | [| hhhh | iiii] | | j |

| Location | Format |
|----------|---------------------------------|
| a | Rotation |
| b | Font, Barcode, Graphics & Image |
| c | Width Multiplier |
| d | Height Multiplier |
| eee | Barcode Height(Font size/ID) |
| ffff | Y Position |
| gggg | X Position |
| hhhh | Optional Scalable Font Height |
| iiii | Optional Scalabel Font Width |
| j... | Data String |

Table 3-1

Header Fields: Each of the fields in the record header are described below. The field names are preceded with a reference letter from the preceding table. All characters within the header fields are ASCII, alphanumeric.

a: Rotation

The first field of a header is a single ASCII character that selects the degree of rotation for the data to be printed on a label. Valid rotation values are 1 (0°), 2 (90°), 3 (180°), and 4 (270°) in clockwise.

b: Font, Barcode, Image and Graphic

The second character determines how the rest of the field are interpreted as shown in the table below: Values 0 through 9 select human-readable fonts. Values A through Z select barcode fonts. Values 0 through 8 will select standard bitmapped fonts. Value 9 selects the internal smooth font. Values A through T (capital) will print barcodes with human-readable interpretations. Values a through z (lowercase) will print barcodes only. A font field value X selects a drawing object (line, box, circle) and value Y is used to print an image stored in a module or download directly binary graphic/bitmapped fonts into print buffer.

| Font Field Value | Interpretation |
|------------------|--|
| 0-9 | Font |
| A-T | Barcode with human readable interpretations. |
| a-z | Barcode without human-readable interpretations |
| X | Line,box,circle |
| Y | Image |

Table 3-2

c: Width Multiplier

The third character during 1~9 and A~O represent Width Multiplier. For fonts, parameter during 1~8, the width multiplier represents the number of times the selected font dot tables are multiplied and has no effect on the character height. For barcodes, this character specifies the wide bar width or numerator of ratio. Values 1 through 9 and A through O will give a wide bar width range (unit: dot).

d: Height Multiplier

The fourth character during 1~9 and A~O represent Height Multiplier. For fonts, parameter during 1~8, the Height multiplier represents the number of times the selected font dot tables are multiplied and has no effect on the character width. For barcodes, this character specifies the narrow bar width or denominator of ratio. Values 1 through 9 and A through O will give a narrow bar width range (unit: dot).

eee: Font Selection, Barcode Height

This field has interpretations dependent on the value of the font's b field as shown in the following table.

| Font Field b Value | Field eee Interpretation |
|--------------------|-----------------------------|
| 0-8 | unused |
| 9 | Font selection |
| A-T | Barcode height with text |
| a-z | Barcode height without text |
| X,Y | unused |

Table 3-3

Smooth font/ download dot matrix font represent font selection, parameter range 000-007,P06,P08,P10,P12,P14,P18,A00-A99,B00-B99. Vector font represent font data type, parameter

range S00-Szz, s00-szz, U00-Uzz, u00-uzz. Barcode represent barcode height, parameter range 000~999 (unit: dot, mm/10, inch/100), default works if less than 1 dot.

ffff: Ordinate

The lower left corner of a label is considered as the “coordinate origin”. The Y position field is a vertical coordinate that determines how far above the coordinate origin the data is to be printed. Field data unit: dot, mm/10, inch/100.

gggg: Abscissa

This field is a horizontal offset that determines how far to the right of coordinate origin the data will be printed.

hhhh: Optional Scalable Font Height

The height of a Vector font can be specified in two ways, pounds and dots. To specify the height in pounds, the first character of the field is a “P” followed by the number of pounds ranging from 004 to 999. To specify in dots, use only 4 digits.

iiii: Optional Scalable Font Width

The width of a Vector font can be specified in two ways, pounds and dots. To specify the width in pounds, the first character of the field is a “ P” followed by the number of pounds ranging from 004 to 999. To specify in dots, use only 4 digits.

jj..j: Data Field

The final field contains data that will actually be printed on the label. A string of data can be up to 1024 characters in length (except when using the PDF417 code, which may be up to 3000 characters long) ending with a carriage return. Characters placed in the data field will be printed so long as they fall within the physical range of the print -head. When the last field is sent to the printer, the formatting session is ended by sending one of the terminator label formatting commands E,e,X or s.

Record Type

Each of the six record types has its own field structure and they are described as follows:

1) **Internal Bit-mapped Font**

| Field | Value Inputs | Description |
|-------|--|-------------------------------|
| a | 1, 2, 3 and 4 | Rotation |
| b | 0 to 8 | Font |
| c | 1 to 8 | Dot width multiplying factor |
| d | 1 to 8 | Dot height multiplying factor |
| eee | 000 | Undefined |
| ffff | 0000 to 9999 | Ordinate |
| gggg | 0000 to 9999 | Abcissa |
| jj..j | Valid ASCII character string up to 1024 characters followed by a termination character | Data |

Table 3-4

2) **Smooth Font, Downloaded Bit-mapped Fonts**

| Field | Value inputs | Description |
|-------|---------------|-------------|
| a | 1, 2, 3 and 4 | Rotation |
| b | 9 | Font |

| | | |
|-------|---|-------------------------------|
| c | 1 to 8 | Dot width multiplying factor |
| d | 1 to 8 | Dot height multiplying factor |
| eee | 000-007,P06,P08,P10,P12,P14,P18,A00-A99,B00-B99 | Fonts |
| ffff | 0000 to 9999 | Ordinate |
| gggg | 0000 to 9999 | Abscissa |
| jj..j | Valid ASCII character string up to 1024 characters followed by a termination character. | Data |

Table 3-5

3) Vector font

eee field identifies the Vector font, and data type (hex ASCII).

| Field | Value input | description |
|-------|---|---------------------------------|
| a | 1, 2, 3 and 4 | Rotation |
| b | 9 | Fixed Value |
| c | 1 to 8 | Dot width |
| d | 1 to 8 | Dot height |
| eee | S00-Szz, s00-szz, U00-Uzz, u00-uzz | Font data type |
| ffff | 0000 to 9999 | Ordinate |
| gggg | 0000 to 9999 | Abscissa |
| hhhh | P004-P999, 0016-2817 | Character height, pounds , dots |
| iiii | P004-P999, 0014-2817 | Character width, pounds, dots |
| jj..j | Valid ASCII character string up to 1024 characters followed by a termination character. | Data |

Table 3-6

4) Barcode

To generate a barcode, the valid inputs for the font field b are letters. Uppercase letters will print a human-readable text below the barcode. Lowercase letters will print the barcode only.

| Field | Value input | description |
|-------|---|-------------------------------------|
| a | 1, 2, 3 and 4 | Rotation |
| b | A ~ T , a ~ t , u , z | Barcode type |
| c | 1 to 9 and A to O | wide bar width or ratio numerator |
| d | 1 to 9 and A to O | Narrow bar width or ratio numerator |
| eee | 001 to 999 | Barcode height |
| ffff | 0000 to 9999 | Ordinate |
| gggg | 0000 to 9999 | Abscissa |
| jj..j | ASCII character followed by a termination character | data |

Table 3-7

5) Image

a) Invoke the loaded image

An image record cooperates with STX I to print a binary image stored in a memory module. When the image saved in memory is printed, an image record is necessary. It only supports 0 degree prints and does not support rotation. The image can be handled in mirror mode and all kinds of bit.

| Field | Value Inputs | Description |
|-------|---|-------------------------------|
| a | 1 | Fixed Value |
| b | Y | Bitmap |
| c | 1 to 8 | Dot height multiplying factor |
| d | 1 to 8 | Dot width multiplying factor |
| eee | 000 | Fixed Value |
| fff | 0000 to 9999 | Ordinate |
| gggg | 0000 to 9999 | Abscissa |
| jj..j | See ASCII, Max 8 characters and follow with a carriage retrun. It doesn't need memory name. | Bitmap name |

Table 3-8

b) Download to print buffer directly

It only supports the binary images or bit-mapped font with certain coding formats and does not support enlargement, mirror image or rotation. When downloading many fonts, they shall be ranged with equal space in a same line.

| Field | Values Input | Description |
|-------|--|--|
| a | 1 | Fixed value |
| b | Y | Bit map |
| c | 1 | Dot height multiplying factor |
| d | 1 | Dot width multiplying factor |
| eee | 001-256 | Specify the quantity of bit-mapped fonts to be downloaded with the range from 001 to 256 |
| fff | 0000 to 9999 | Ordinate |
| gggg | 0000 to 9999 | Abscissa |
| <CR> | Carriage return | Termination character of current field |
| ww | Two binary characters with the higher bit coming first | Width of a image or a single word. |
| hh | Two binary characters with the lower bit coming first. | Height of a image or a single word. |
| | Binary data | Image /font data |

Table 3-9

c) Download to print buffer directly

It only supports certain coding formats (specialized for drivers) or bit-mapped fonts, and does not support enlargement, mirror or rotation. The coordinate of images is fixed to (0,0).

| Field | Values Input | Description |
|-------|-----------------|---|
| a | 1 | Fixed value |
| b | Y | Bit map |
| c | 1 | Dot height multiplying factor. |
| d | 1 | Dot width multiplying factor. |
| eee | 999 | Fixed value and specify the format of the image to be downloaded. |
| fff | 0000 | Fixed value |
| gggg | 0000 | Fixed value |
| <CR> | Carriage return | Termination character of current field |

| | | |
|-------|---|-------------------------------------|
| ww | Two binary characters with the lower bit coming first | Width of an image or a single word. |
| hh | Two binary characters with the lower bit coming first | Height of a image or a single word. |
| | Coding data | Image data |

Table 3-10

6) Graphics

Lines, boxes, polygons and circles can be generated by using graphics. This function is selected by entering an X in field b.

| Field | Value Inputs | Description |
|-------|--------------|----------------------|
| a | 1 | Fixed value |
| b | X | Lines or boxes, etc. |
| c | 1 | Fixed value |
| d | 1 | Fixed value |
| eee | 000 | Fixed value |
| fff | 0000 to 9999 | Ordinate |
| gggg | 0000 to 9999 | Abscissa |
| jj-.j | Lhhhvvv | Lines* |
| | lhhhhvvvv | Lines** |
| | Bhhhvvtss | Rectangles*** |
| | bhhhhvvvtss | Rectangles**** |

Table 3-11

* Line: Lhhhvvv

L = "L" specifies line drawing
 hhh = Horizontal width of line (three Digits) 000-999
 vvv = Vertical height of line (three Digits) 000-999

** Lines: lhhhhvvvv

l = "l" specifies line drawing
 hhhh = Horizontal width of line (four Digits) 0000-9999
 vvvv = Vertical height of line (four Digits) 0000-9999

*** Rectangles: Bhhhvvtss

B = "B" specifies rectangle drawing
 hhh = Horizontal width of box (three Digits) 000-999
 vvv = Vertical height of box (three Digits) 000-999
 bbb = Thickness of bottom and top box edge (three Digits) 000-999
 sss = Thickness of sides of box (three Digits) 000-999

**** Rectangles: bhhhhvvvtss

b = "b" specifies rectangle drawing
 hhhh = Horizontal width of box (four Digits) 0000-9999
 vvvv = Vertical height of box (four Digits) 0000-9999
 bbbb = Thickness of bottom and top box edge (four Digits) 0000-9999
 ssss = Thickness of right and left sides of box (four Digits) 0000-9999

Polygons

By defining the positions of the corners, user may easily create a polygon in any patterns, such as a single line (two points), triangle (three points) or any shap with more than three corners.

Record structure for a polygon as below:

1 X 11 ppp rrrr cccc P ppp bbbb rrrr cccc rrrr cccc ... <CR>

| Field | Inout Value | Description |
|-------|--------------|---|
| a | 1 | Fixed value |
| b | X | Graphic |
| c | 1 | Fixed value |
| d | 1 | Fixed value |
| ppp | 000 to 999 | Line filling pattern (line width) in dots |
| rrrr | 0000 to 9999 | X position of start point |
| cccc | 0000 to 9999 | Y position of start point |
| P | P | Polygon ID (fixed value) |
| ppp | 001 | Line filling pattern (fixed value) |
| bbbb | 0001 | Line brushing pattern (fixed value) |
| rrrr | 0000 to 9999 | X position of point 2 |
| cccc | 0000 to 9999 | Y position of point 2 |
| rrrr | 0000 to 9999 | X position of point 3 |
| cccc | 0000 to 9999 | Y position of point 3 |
| | 0000 to 9999 | Continue listing points |
| <CR> | <CR> | Termination character |

Table 3-12

Note: The points must be specified in the order that they are to be drawn. The last pointspecified is automatically connected to the first point specified to enclose a polygon.

Circles

A circle is defined by its center point and its radius.

The circles record structure is shown as below:

1 X 11 ppp rrrr cccc C ppp bbbb rrrr <CR>

| Field | Values Input | Description |
|-------|--------------|---|
| a | 1 | Fixed value |
| b | X | Graphic |
| c | 1 | Fixed value |
| d | 1 | Fixed value |
| ppp | 000 to 999 | Line fill pattern (edge thickness) in dots. When the value is 0, a solid circle is to be drawn. When the value doesn't equal to 0, a circle is drawn for edge thickness according to the settings. The unit is dot. |
| rrrr | 0000 to 9999 | X position of the center point |
| cccc | 0000 to 9999 | Y position of the center point |
| C | C | Circle ID (fixed value) |
| ppp | 001 | Line fill pattern (fixed value) |
| bbbb | 0001 | Line brush patter (fixed value) |
| rrrr | 0000 to 9999 | Radius of the circle |
| <CR> | <CR> | Termination character |

Table 3-13

Barcode Types

BPLA assumes that barcodes specified in uppercase are with text and those specified in lowercase are with no text.

| | Type | Length | Verify | Valid ASCII characters in decimal |
|---|---|------------|--------|-----------------------------------|
| A | <u>Code 39</u> | Changeable | No | 32,36,37,42,43,45-57,65-90 |
| a | | | | |
| B | <u>UPCA</u> | 11+1 | Yes | 48-57,numeric |
| b | | | | |
| C | <u>UPCE</u> | 6+1 | Yes | 48-57,numeric |
| c | | | | |
| D | <u>Interleaved 2 of 5</u> | Changeable | No | 48-57,numeric |
| d | | | | |
| E | <u>Code 128</u> | Changeable | Yes | 32-127 |
| e | | | | |
| F | <u>EAN13</u> | 12+1 | Yes | 48-57,numeric |
| f | | | | |
| G | <u>EAN8</u> | 7+1 | Yes | 48-57,numeric |
| g | | | | |
| H | <u>HBIC(code 39)</u> | Changeable | Yes | 32,36-39,42,43,45-57,65-90 |
| h | | | | |
| I | <u>Codabar</u> | Changeable | No | 36,43,45-58,65-68 |
| i | | | | |
| J | <u>Interleaved 2 of 5</u> | Changeable | Yes | 48-57,numeric |
| j | | | | |
| K | <u>Industry 2 of 5</u> | Changeable | No | 48-57,numeric |
| k | | | | |
| L | <u>Shipping bearer code</u> | 13 | Yes | 48-57,numeric |
| l | | | | |
| M | <u>UPC2</u> | 2 | Yes | 48-57,numeric |
| m | | | | |
| N | <u>UPC5</u> | 5 | Yes | 48-57,numeric |
| n | | | | |
| O | <u>Code 93</u> | Changeable | No | 35-38,42-58,65-90,97-122 |
| o | | | | |
| P | <u>POSTNETCode</u> | 5,9,11 | Yes | 48-57,numeric |
| p | | | | |
| Q | <u>UCC/EAN</u> | 19 | Yes | 48-57,numeric |
| q | | | | |
| R | <u>Matrix 2 of 5</u> Europe standard | Changeable | Yes | 48-57,numeric |
| r | | | | |
| S | <u>Matrix 2 of 5</u> Japan standard | Changeable | Yes | 48-57,numeric |
| s | | | | |
| T | <u>Postnet 25(China)</u> | 11 | No | 48-57,numeric |
| t | | | | |
| u | <u>MAXICODE</u> | Changeable | Yes | Alphanumeric |
| z | <u>PDF417</u> | Changeable | Yes | All |
| v | <u>QR CODE</u> | Changeable | Yes | All |
| w | <u>DATAMATRIX</u> | Changeable | Yes | All |

Barcode terms:

- **Barcode:** Bar and space with different width and reflectivity is combined to show certain information symbol according to the coding rule.

- **Barcode factors:**Show the bar and space of barcode, namely factors.
- **Bar:**The factor with lower reflectivity.
- **Space:**The factor with higher reflectivity.
- **Barcode character:**a group of barcode factors which show a numeric, letter and special symbol.
- **Bit space:**Lies between two close barcode characters and doesn't indicate any information.
- **Unit factor width:**The width of narrow factor.
- **Barcode height:**The longer size of bar.
- **Barcode width:**the shorter size of bar.
- **Barcode character set:**Data character range is specified from a barcode system.
- **Discrete barcode:**In barcode symbols it means the one with bit space between two close barcode characters, otherwise it is named as continuous barcode.

A(a) Code 39

Discrete, checksum (without check character), alphanumeric code format.

Valid characters: 0~9, A~Z, \$%*+-. / space (44 characters in total). Thereinto, the * functions only as a start/termination symbol and may not be inputed.

Length: Changeable

Valid bar width:The ratio of wide to narrow bars can range from 2:1 to 3:1.

B(b) UPCA

Continuous, checksum(with check character), alphanumeric code format.

Valid character: 0~9.

Length: 12digits. No matter the user provides 11 digits or 12 digits, the printer automatically compute the checksum according to the first 11 digits entered.

Valid bar width: The fourth character of record is the width of a narrow bar in dots. All other bars' widths are of a ratio of the narrow bar (2 times the narrow bar width , 3 times the narrow bar width, 4 times the narrow bar width).The third character of record is not available.

C(c) UPCE

Continuous, checksum(with check character), numeric coding format.

Valid character: 0~9.

Length: 7digits and the seventh is hidden among the parity array. No matter the user provides 6 or 7 digits, the printer automatically computes the check sum according to the first 6 digits entered.

Valid bar width: The fourth character of record is the width of a narrow bar in dots. All other bars' widths are of a ratio of the narrow bar (2 times the narrow bar width , 3 times the narrow bar width, 4 times the narrow bar width). The third character of record is not available.

D(d) Interleaved 2 of 5

Continuous, checksum(without check character) and numeric coding format.

Valid character: 0-9

Length: Variable and shall be of even numbers. When it is of odd numbers, the printer will automatically add a 0 at the start of the data.

Valid bar width: The expected ratio of wide to narrow can ranges from 2:1 to 3:1.

E(e) Code 128

Continuous, checksum (M-103) and all in ASCII character coding format.

Valid character: The entire 128 ASCII characters set.

Length: Variable.

Valid bar width: The fourth charcter of record is the width of narrow bar. Any other bar width is a ratio of the narrow bar (2 times, 3 times, 4 times). The third character of record is not available.

The valid characters are made of the entire ASCII character set which includes three subsets: A (from 00 the 5FH), B (from 20 to 7FH) and C (double digits set from 00 to 99). To make the input of characters from 00H to 1FH easier, BPLA agrees using the range from 60H to 7FH to represent characters between 00H to 1FH. For example, when inputing a character valued in 00H, users shall input 60H instead of 00H.

The default code subset is B, otherwise the first character (A, B or C) of the data field determines the subset.

Special characters are inputed in a two-character pattern.

| Value Inputs | A set | B set | C set |
|--------------|-------|-------|-------|
| &A | FNC3 | FNC3 | N/A |
| &B | FNC2 | FNC2 | N/A |
| &C | SHIFT | SHIFT | N/A |
| &D | CODEC | CODEC | N/A |
| &E | CODEB | FNC4 | CODEB |
| &F | FNC4 | CODEA | CODEA |
| &G | FNC1 | FNC1 | FNC1 |

User may use SHIFT key to switch between A set and B set. However the switch is valid only for the character followed and then it gets back to the previous code set.

CODEA, CODEB, CODEC are used to realize the switch among A,B and C sets and the switch is always valid until the current barcode is finished or another switch is performed. && are interpreted as &. When & is followed by a character (lets say X) other than those listed above, they will be interpreted into two characters: & and X.

To achieve a simple code, it is recommended to adapt the following regulations when encoding.

- 1) Since code 128 subset C is used for double density encoding of numeric data, if there are 2 or more successive digits at the beginning of the data or 4 or more successive digits in the data, it is advisable to start the data field with a C character or switch to C to encode in C set. However, Subset C can only encode an even number of numeric characters, when the data to be encoded includes an odd number of numeric characters and the numeric characters are at the beginning of the data, the last character shall be encoded in followed set A or B. If the numeric character are in the data, the first character shall be encoded in forgoing subset A or B and the left even numbers of numeric characters are encoded in subset C.
- 2) While encoding in subset A (B), one and only one character (lets say X) of subset B (A) appears in the data field, user may use <SHIFT><X> to encode it in subset B (A). If those characters are more than one, use shall use the usual way to switch the subset. For example, <CODEB><X><X><X>...<CODEA>.
- 3) The printer automatically computes the checksum of Code 128.

F(f) EAN13

Continuous, checksum(with check character) and numeric coding format.

Valid Length: 0~9

Length: 13 digits. No matter the user provides 12 or 13 digits, the printer will automatically computes the checksum according to the firstly entered 12 digits.

Valid bar width: The fourth character of record is the narrow bar width in dots. Any other bar width is the ratio of the narrow bar width.(2, 3 or 4 times). The third character of record is not available.

G(g) EAN8

Continuous, checksum (with check character), numeric coding format.

Valid character:0~9

Length:8digits. No matter the user provides 7 or 8 digits, the printer will automatically computes the checksum according to the firstly entered 7 digits.

Valid bar width:The fourth character of record is the narrow bar width in dots. Any other bar width is the ratio of the narrow bar width.(2, 3 or 4 times).

H(h) HBIC (Code 39 with checksum)

Code 39 is also called as HBIC when the M-43 check sum exists.

Discrete, checksum(M-43)and alphanumeric coding format.

Valid characters:0~9, A~Z, \$%*+-. / space (44 in total). The * character functions only as Start/termination symbol and does not appear in the data.

Length: Variable.

Valid bar width: The expected ratio of wide to narrow can ranges from 2:1 to 3:1.

I(i) CODABAR

Discrete, checksum(without check character)and alphanumeric coding format.

Valid character:0~9, A~D, -\$/+. (20 characters in total). The characters A,B,C,D functions only as the start/termination symbol (optional) and does not appear in the data. While being used as a termination symbol, it can be replaced with TN*E.

Length: Variable.

Valid bar width: The expected ratio of wide to narrow can ranges from 2:1 to 3:1.

J(j) Interleaved 2 of 5

Continuous, check sum(M-10)and numeric coding format.

Valid character:0-9.

Length: Variable and shall be of even numbers. When it is of odd numbers, the printer will automatically add a zero to the beginning of the data.

Valid bar width:The expected ratio of wide to narrow can ranges from 2:1 to 3:1.

K(k) Industrial 2 of 5

Discrete, check-sum (without check character) and numeric coding format.

Valid character:0-9.

Length: Variable.

Valid bar width:The ratio of wide to narrow can ranges from 2:1 to 3:1.

L(l) Shipping Bearer Code

Continuous, check sum(M-10)and numeric coding format.

Valid character:0-9.

Length: 13 digits.

Wide bar width:The expected ratio of wide to narrow can ranges from 2:1 to 3:1.

M(m) UPC2

Continuous, checksum (with check character) and numeric coding format.

Valid character:0-9.

Length: 2digits.

Valid bar width:The fourth character is the narrow bar width in dots. Any other bar width is the ratio of the narrow bar(2,3 or 4 times).The third character of record is not available.

N(n) UPC5

Continuous, check sum (with check character) and numeric coding format.

Valid character:0-9.

Length: 5 digits.

Valid bar width: The fourth character is the narrow bar width in dots. Any other bar width is the ratio of the narrow bar(2,3 or 4 times). The third character of record is not available.

O(o) Code 93

Continuous, non-check sum(without check character) and alphanumeric coding format.

Valid character: 0~9, A~Z, -. \$%/+ space (43 characters in total).

Length: variable.

Valid bar width: The fourth character is the narrow bar width in dots. Any other bar width is the ratio of the narrow bar(2,3 or 4 times). The third character of record is not available.

To realize full ASCII encoding, CODE 93 defines 4 control characters: circle\$, circle%, circle/, circle+. They can be inputed by inputing a, b, c or d. Code 93 may has double check sums, this type has no check character.

To realize full ASCII encoding, CODE 93 defines 4 control characters: circle\$, circle%, circle/, circle+. They can be inputed by inputing a, b, c or d. Code 93 may has double check sums, this type has no check character.

P(p) POSTNET

Continuous, check sum(check character) and numeric coding format.

Valid character: 0-9.

Length: 5digits, 9digits, 11digits.

Valid bar width: The fourth character of record is narrow bar width (dot). The third character of record is not available.

Q(q) Code UCC/EAN

Continuous, check-sum(with check character) and numeric coding format.

Valid character:0-9.

Length: 19 digits.

Valid bar width:The fourth character is the narrow bar width in dots. Any other bar width is the ratio of the narrow bar(2,3 or 4 times). The third character of record is not available.

R(r) Matrix 2 of 5(Europe standard)

Discrete, checksum(may has one check character) and numeric coding format.

Valid character:0~9.

Length: Variable.

Valid bar width: The ratio of wide to narrow can ranges from 2:1 to 3:1.

S(s) Matrix 2 of 5(Japan standard)

Discrete, check sum(may has one check character) and numeric coding format.

Valid character:0~9.

Length: Variable.

Valid bar width:The ratio of wide to narrow can ranges from 2:1 to 3:1.

T(t) Postnet 2 of 5(China)

Discrete, check sum (without check character) and numeric coding format.

Valid character:0~9.

Length: 11 digits.

Valid bar width:The ratio of wide to narrow can ranges from 2:1 to 3:1.

u MAXICODE

Valid character:Alphanumeric.

Length:Variable.

The data shall not exceed 84 characters long and it consists of 5 parts.

- 1) Basic postal code made of 5 digits.
- 2) The second postal code made of 4 digits.
- 3) The country code made of 3 digits.
- 4) The service level in 3 digits.
- 5) Character string.

Valid bar width: The ratio of wide to narrow cannot be adjusted.

z PDF417

Valid character:All ASCII characters.

Length: Variable.

The barcode data consists of 6 parts.

- 1) The 1st character of data: 'F':normal type'T':truncted type.
- 2) The 2nd character of data: 0~8,check level.
- 3) The 3rd and 4th character s: Appearance ratio in two digits; The 3rd character is numerator and the 4th character is the denominator;00 represents 1:2.
- 4) The 5th and 6th character s: 03~90,the number of lines.
- 5) The 7th and 8th character s: 01~30,the number of columns.
- 6) Data to be encoded.

v QRCODE

Valid character:All ASCII characters.

Length: Variable.

The barcode data consists of 6 parts:

- 1) The 1st and 2nd character s of data: The width of the basic elements; value range: positive integers.
- 2) The 3rd character of data: Symbol Type; value range: 1 - the original type, 2 - enhanced type (recommended).
- 3) The 4th character of data:Language pattern; value range: 0 - Chinese, 1 - Japanese .
- 4) The 5th , 6th , 7th and 8th characters of data: The number of data that needs to be encoded; value range: four decimal numbers.
- 5) Followings are data to be encoded:

The encode data consists of 5 parts with following input formats:

- i. Daabbcc:
 - D: Link structure mode, input specified character "D", this mode is optional. If select this mode, the following three parameters and separators must be specified.
 - aa: Position of specified symbol, input 2 decimal numbers.
 - bb: Amount of symbols, input 2 decimal numbers.
 - cc: Parity data, input 2 hex numbers.
 - ,: Fixed separators.
- ii. E:Error correction code level; value range: L, M, Q, H, followed by larger error correction code level.
- iii. M:Mask pattern reference; value range: default to automatically mask.
- iv. M:Data input mode; value range: A or M, A for the automatic mode (recommended); M for manual input mode; if specify A mode, the character mode is not necessary to be specified;
 - If specify M mode, character mode must be specified. The default is automatic mode.
- v. < character mode ><DATA1>,
 - < character mode ><DATA2>,
 - < character mode ><DATA3>,
 -

< character mode ><DATA n>

Notes: n>=200

Character input mode <N,A,B,K>

N:number (0~9)

A:Letters and numbers are mixing arranged (0~9)(A~Z)(SP,\$,%*,+,-,.,/:)

Bxxxx:xxxx is the following data number, data is 8-bit byte mode.

K:Chinese characters, with corresponding to the 4th character of barcode data.

Valid bar width:The ratio of wide to narrow can not be adjusted.

Example: Code QR

<STX>L

H20

*1v000000500040010200025QA,0123456789ABCD 2D code(recommand automatic mode, data mode symbol A can be omitted).

*1v000000500040010200018HM,N12345678912345

*1v000000500040010200009MM,AAC-42

*1v000000500040010200037LM,N0123456789012345,AABC,B0006qrcode

1v000000500040010200042D03048F,LM,N0123456789,A12AABB,B0006qrcode

E

Appendix

Appendix 1 ASCII table

| | Char | Dec | Hex | Char | Dec | Hex | Char | Dec | Hex | Char | Dec | Hex |
|--------|------|-----|-----|------|-----|-----|------|-----|-----|------|-----|-----|
| Ctrl @ | NUL | 0 | 00 | | 32 | 20 | @ | 64 | 40 | ` | 96 | 60 |
| Ctrl A | SOH | 1 | 01 | ! | 33 | 21 | A | 65 | 41 | a | 97 | 61 |
| Ctrl B | STX | 2 | 02 | Ò | 34 | 22 | B | 66 | 42 | b | 98 | 62 |
| Ctrl C | EXT | 3 | 03 | # | 35 | 23 | C | 67 | 43 | c | 99 | 63 |
| Ctrl D | EOT | 4 | 04 | \$ | 36 | 24 | D | 68 | 44 | d | 100 | 64 |
| Ctrl E | ENQ | 5 | 05 | % | 37 | 25 | E | 69 | 45 | e | 101 | 65 |
| Ctrl F | ACK | 6 | 06 | & | 38 | 26 | F | 70 | 46 | f | 102 | 66 |
| Ctrl G | BEL | 7 | 07 | Ô | 39 | 27 | G | 71 | 47 | g | 103 | 67 |
| Ctrl H | BS | 8 | 08 | (| 40 | 28 | H | 72 | 48 | h | 104 | 68 |
| Ctrl I | HT | 9 | 09 |) | 41 | 29 | I | 73 | 49 | i | 105 | 69 |
| Ctrl J | LF | 10 | 0A | * | 42 | 2A | J | 74 | 4A | j | 106 | 6A |
| Ctrl K | VT | 11 | 0B | + | 43 | 2B | K | 75 | 4B | k | 107 | 6B |
| Ctrl L | FF | 12 | 0C | , | 44 | 2C | L | 76 | 4C | l | 108 | 6C |
| Ctrl M | CR | 13 | 0D | - | 45 | 2D | M | 77 | 4D | m | 109 | 6D |
| Ctrl N | SO | 14 | 0E | . | 46 | 2E | N | 78 | 4E | n | 110 | 6E |
| Ctrl O | SI | 15 | 0F | / | 47 | 2F | O | 79 | 4F | o | 111 | 6F |
| Ctrl P | DLE | 16 | 10 | 0 | 48 | 30 | P | 80 | 50 | p | 112 | 70 |
| Ctrl Q | DC1 | 17 | 11 | 1 | 49 | 31 | Q | 81 | 51 | q | 113 | 71 |
| Ctrl R | DC2 | 18 | 12 | 2 | 50 | 32 | R | 82 | 52 | r | 114 | 72 |
| Ctrl S | DC3 | 19 | 13 | 3 | 51 | 33 | S | 83 | 53 | s | 115 | 73 |
| Ctrl T | DC4 | 20 | 14 | 4 | 52 | 34 | T | 84 | 54 | t | 116 | 74 |
| Ctrl U | NAK | 21 | 15 | 5 | 53 | 35 | U | 85 | 55 | u | 117 | 75 |

| | Char | Dec | Hex | Char | Dec | Hex | Char | Dec | Hex | Char | Dec | Hex |
|--------|------|-----|-----|------|-----|-----|------|-----|-----|------|-----|-----|
| Ctrl V | SYN | 22 | 16 | 6 | 54 | 36 | V | 86 | 56 | v | 118 | 76 |
| Ctrl W | ETB | 23 | 17 | 7 | 55 | 37 | W | 87 | 57 | w | 119 | 77 |
| Ctrl X | CAN | 24 | 18 | 8 | 56 | 38 | X | 88 | 58 | x | 120 | 78 |
| Ctrl Y | EM | 25 | 19 | 9 | 57 | 39 | Y | 89 | 59 | y | 121 | 79 |
| Ctrl Z | SUB | 26 | 1A | : | 58 | 3A | Z | 90 | 5A | z | 122 | 7A |
| Ctrl [| ESC | 27 | 1B | ; | 59 | 3B | [| 91 | 5B | { | 123 | 7B |
| Ctrl \ | FS | 28 | 1C | < | 60 | 3C | \ | 92 | 5C | | 124 | 7C |
| Ctrl] | GS | 29 | 1D | = | 61 | 3D |] | 93 | 5D | } | 125 | 7D |
| Ctrl ^ | RS | 30 | 1E | > | 62 | 3E | ^ | 94 | 5E | ~ | 126 | 7E |
| Ctrl _ | US | 31 | 1F | ? | 63 | 3F | _ | 95 | 5F | | 127 | 7F |

| Char | Dec | Hex | Char | Dec | Hex | Char | Dec | Hex | Char | Dec | Hex |
|------|-----|-----|------|-----|-----|------|-----|-----|------|-----|-----|
| Ç | 128 | 80 | á | 160 | A0 | | 192 | C0 | Ó | 224 | E0 |
| Û | 129 | 81 | í | 161 | A1 | | 193 | C1 | β | 225 | E1 |
| é | 130 | 82 | ó | 162 | A2 | | 194 | C2 | Ô | 226 | E2 |
| â | 131 | 83 | ú | 163 | A3 | | 195 | C3 | Ò | 227 | E3 |
| ä | 132 | 84 | ñ | 164 | A4 | | 196 | C4 | ö | 228 | E4 |
| à | 133 | 85 | Ñ | 165 | A5 | | 197 | C5 | Õ | 229 | E5 |
| â | 134 | 86 | ª | 166 | A6 | ã | 198 | C6 | μ | 230 | E6 |
| ç | 135 | 87 | º | 167 | A7 | Ã | 199 | C7 | þ | 231 | E7 |
| ê | 136 | 88 | ¿ | 168 | A8 | | 200 | C8 | ƒ | 232 | E8 |
| ë | 137 | 89 | ® | 169 | A9 | | 201 | C9 | Ú | 233 | E9 |
| è | 138 | 8A | | 170 | AA | | 202 | CA | Û | 234 | EA |
| ï | 139 | 8B | 1/2 | 171 | AB | | 203 | CB | Ü | 235 | EB |
| î | 140 | 8C | 1/4 | 172 | AC | | 204 | CC | ý | 236 | EC |
| ì | 141 | 8D | ¡ | 173 | AD | | 205 | CD | Ý | 237 | ED |
| Ä | 142 | 8E | | 174 | AE | | 206 | CE | | 238 | EE |
| Å | 143 | 8F | - | 175 | AF | | 207 | CF | | 239 | EF |
| É | 144 | 90 | | 176 | B0 | Ð | 208 | D0 | | 240 | F0 |
| Æ | 145 | 91 | | 177 | B1 | Ð | 209 | D1 | ± | 241 | F1 |
| Æ | 146 | 92 | ² | 178 | B2 | Ê | 210 | D2 | | 242 | F2 |
| ô | 147 | 93 | ³ | 179 | B3 | Ë | 211 | D3 | 3/4 | 243 | F3 |
| õ | 148 | 94 | ´ | 180 | B4 | È | 212 | D4 | | 244 | F4 |
| ò | 149 | 95 | Á | 181 | B5 | | 213 | D5 | | 245 | F5 |
| û | 150 | 96 | Â | 182 | B6 | Í | 214 | D6 | ÷ | 246 | F6 |
| ù | 151 | 97 | À | 183 | B7 | Î | 215 | D7 | ¸ | 247 | F7 |
| ÿ | 152 | 98 | © | 184 | B8 | Ï | 216 | D8 | º | 248 | F8 |
| Ö | 153 | 99 | ¹ | 185 | B9 | | 217 | D9 | ” | 249 | F9 |
| Ü | 154 | 9A | | 186 | BA | | 218 | DA | · | 250 | FA |
| ø | 155 | 9B | » | 187 | BB | | 219 | DB | | 251 | FB |
| £ | 156 | 9C | | 188 | BC | | 220 | DC | | 252 | FC |
| Ø | 157 | 9D | ¢ | 189 | BD | | 221 | DD | | 253 | FD |
| x | 158 | 9E | ¥ | 190 | BE | ì | 222 | DE | | 254 | FE |
| f | 159 | 9F | | 191 | BF | | 223 | DF | | 255 | FF |

Appendix 2 Supported Internal Fonts

All character bit-mapped fonts supported by BPLA are described in this section. Each font has been given a name (font ID) for programming purpose.

Font 0 through 8 use the slash zero conventions for distinguishing between the zero and the alphabetic 0. The slash zero can be conversed to zero with the label formatting command. 000 through 007 in font 9 are Courier. These fonts are non-proportional. Therefore all of the characters take up the same space when printed. This is helpful when using variable data in a fixed area. P06,P08,P10,P12,P14,P18 in font 9 are ASD pattern and are propotioanl fonts, each character will take up a different amount of space when printed. For example, the letter M will be larger than the letter l.

Font sizes see below table:

Font 4:23 dots width x45 dots height

23H - 2FH: # \$ % & () * + , - . /
30H - 3FH: 0 1 2 3 4 5 6 7 8 9 :
40H - 4FH: A B C D E F G H I J K L M N O
50H - 5FH: P Q R S T U V W X Y Z
60H - 6FH: A B C D E F G H I J K L M N O
70H - 7FH: P Q R S T U V W X Y Z
80H - 8FH: Ç Ä Å
90H - 9FH: É Ê Ñ Ò Ó Ô Ù Ú Û Ü Ý Þ ß à á â ã
A0H - AFH: Ñ ò
B0H - BFH:
C0H - CFH:
D0H - DFH: ß
E0H - E1H:

Font 5:23 dots width x61 dots height

23H - 2FH: # \$ % & () * + , - . /
30H - 3FH: 0 1 2 3 4 5 6 7 8 9 :
40H - 4FH: A B C D E F G H I J K L M N O
50H - 5FH: P Q R S T U V W X Y Z
60H - 6FH: A B C D E F G H I J K L M N O
70H - 7FH: P Q R S T U V W X Y Z
80H - 8FH: Ç Ä Å
90H - 9FH: É Ê Ñ Ò Ó Ô Ù Ú Û Ü Ý Þ ß à á â ã
A0H - AFH: Ñ ò
B0H - BFH:
C0H - CFH:
D0H - DFH: ß
E0H - E1H:

Font 6:38 dots width x69 dots height

23H - 2FH: # \$ % & () * + , - . /
30H - 3FH: 0 1 2 3 4 5 6 7 8 9 :
40H - 4FH: A B C D E F G H I J K L M N O
50H - 5FH: P Q R S T U V W X Y Z
60H - 6FH: A B C D E F G H I J K L M N O
70H - 7FH: P Q R S T U V W X Y Z
80H - 8FH: Ç Å Ä Å
90H - 9FH: É Ê Ñ Ò Ó Ô Õ Ö Ø
A0H - AFH: Ñ Ò
B0H - BFH:
C0H - CFH:
D0H - DFH:
E0H - E1H: ß

Font 7:22 dots width x37 dots height

21H - 3FH: ! " # \$ % & ' () * + , - . / 0 1 2 3 4 5 6 7 8 9 : ; < = > ?
40H - 5FH: @ A B C D E F G H I J K L M N O P Q R S T U V W X Y Z [\] ^ _
60H - 7EH: ` a b c d e f g h i j k l m n o p q r s t u v w x y z { | } ~

Font 8:22 dots width x33 dots height

2BH - 3FH: + 0 1 2 3 4 5 6 7 8 9 < >
40H - 5FH: C E N S T X Z
60H - 7CH: C E N S T , X Z |

Font 9 include six kinds of ASD Smooth font and eight kinds of Courier font

➤ ASD smooth font

6 points:7 dots width x 25 dots height

21H - 3FH: ! " # \$ % & ' () * + , - . / 0 1 2 3 4 5 6 7 8 9 : ; < = > ?
40H - 5FH: @ A B C D E F G H I J K L M N O P Q R S T U V W X Y Z [\] ^ _
60H - 7FH: ` a b c d e f g h i j k l m n o p q r s t u v w x y z { | } ~ ■
80H - 9FH: Ç Ü å ä å ç è é ê ñ Å Ä Å Æ œ ö ø ù ý Ö Ü ø x f
A0H - BFH: á í ó ù ñ Ñ º ½ ¼ | Å Å Å ° Ç ¥
C0H - DFH: ä Å ö ð Ê Ë Ì Í Î Ï |
E0H - FCH: Ó Ô Õ Ö Ø Ù Ú Û Ü Ý ± ¾ + , ° " « ■

8 points:9 dots width x 32dots height

21H - 3FH: !"#\$%&'()*+,-./0123456789:;<=>?
40H - 5FH: @ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_
60H - 7FH: 'abcdefghijklmnopqrstu vwxyz{|}~ ■
80H - 9FH: ÇüéâäåâçêèëïïÄÅÉæÆôöòûÿÖÜø£Ø× f
A0H - BFH: áíóúñÑªº¼½¾ ÁÂÀ© ¢¥
COH - DFH: ãÃ ðÐÊËÈÍÎÏ Ì
E0H - FCH: ÓßÔÒðÕµþÚÛÜÝ ± ¾ ÷ , ° " « ■

10 points:10 dots width x 38 dots height

21H - 3FH: !"#\$%&'()*+,-./0123456789:;<=>?
40H - 5FH: @ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_
60H - 7FH: 'abcdefghijklmnopqrstu vwxyz{|}~ ■
80H - 9FH: ÇüéâäåâçêèëïïÄÅÉæÆôöòûÿÖÜø£Ø× f
A0H - BFH: áíóúñÑªº¼½¾ ÁÂÀ© ¢¥
COH - DFH: ãÃ ðÐÊËÈÍÎÏ Ì
E0H - FCH: ÓßÔÒðÕµþÚÛÜÝ ± ¾ ÷ , ° " « ■

12 points:12 dots width x 44 dots height

21H - 3FH: !"#\$%&'()*+,-./0123456789:;<=>?
40H - 4FH: @ABCDEFGHIJKLMNO
50H - 5FH: PQRSTUVWXYZ[\]^_
60H - 7FH: 'abcdefghijklmnopqrstu vwxyz{|}~ ■
80H - 9FH: ÇüéâäåâçêèëïïÄÅÉæÆôöòûÿÖÜø£Ø× f
A0H - BFH: áíóúñÑªº¼½¾ ÁÂÀ© ¢¥
COH - DFH: ãÃ ðÐÊËÈÍÎÏ Ì
E0H - FCH: ÓßÔÒðÕµþÚÛÜÝ ± ¾ ÷ , ° " « ■

14 Points:14 dots width x 52 dots height

21H - 3FH: !"#\$%&'()*+,-./0123456789:;<=>?
 40H - 4FH: @ABCDEFGHIJKLMNO
 50H - 5FH: PQRSTUVWXYZ[\]^_
 60H - 7FH: 'abcdefghijklmnopqrstuvwxyz{|}~ ■
 80H - 9FH: ÇüéâäåâçêëèïîÄÅÉæÆðöðùÿÖÜø£Ø× f
 A0H - BFH: áíóúñÑªº¼½¾¿ ÁÂÀ© ¢¥
 C0H - DFH: ãÄ å Æ È É Ê Ë Ì Í Î Ï Ñ
 E0H - FCH: ÓÔÕÖ÷ØµþÚÛÜÝ ± ¾ ÷ ¸ ° ¨ « ■

18 points:17 dots width x 66 dots height

21H - 2FH: !"#\$%&'()*+,-./
 30H - 3FH: 0123456789:;<=>?
 40H - 4FH: @ABCDEFGHIJKLMNO
 50H - 5FH: PQRSTUVWXYZ[\]^_
 60H - 6FH: 'abcdefghijklmnop
 70H - 7FH: qrstuvwxyz{|}~ ■
 80H - 8FH: ÇüéâäåâçêëèïîÄÅ
 90H - 9FH: ÉæÆðöðùÿÖÜø£Ø× f
 A0H - AFH: áíóúñÑªº¼½¾¿ ÁÂÀ© ¢¥
 B0H - BFH: ãÄ
 C0H - CFH: å Æ È É Ê Ë Ì Í Î Ï Ñ
 D0H - DFH: ÓÔÕÖ÷ØµþÚÛÜÝ
 E0H - EFH: ± ¾ ÷ ¸ ° ¨ « ■
 F0H - FCH:

➤ Courier Font

Roman-8: 27 dots width x 52 dots height

21H - 2FH: ! " # \$ % & ' () * + , - . /
 30H - 3FH: 0 1 2 3 4 5 6 7 8 9 : ; < = > ?
 40H - 4FH: @ A B C D E F G H I J K L M N O
 50H - 5FH: P Q R S T U V W X Y Z [\] ^ _
 60H - 6FH: ` a b c d e f g h i j k l m n o
 70H - 7FH: p q r s t u v w x y z { | } ~
 80H - 8FH:
 90H - 9FH:
 A0H - AFH: À Â Ê Ë Ì Î Ï Ñ Ò Ó Ô Õ Ö × Ø Ù Ú Û Ü Ý Þ ß
 B0H - BFH: ¯ ́ ˘ ˙ ˚ ˛ ˜ ˝ ; ¨ € ¥ \$ % & ' () * + , - . /
 C0H - CFH: â ê ô û á é ó ú à è ò ù ä ë ö ü
 D0H - DFH: Å î ø Æ å í ø æ Ä ì ö Ü É ì ß Ô
 E0H - EFH: Á Ã ã ð ö Í ï Ó ò Õ õ Š š Ú Ÿ Ÿ
 F0H - FEH: Þ þ · μ ¶ ¼ ½ ¾ ⅓ ⅔ ⅕ ⅖ ⅗ ⅘ ⅙ ⅚ ⅛ ⅜ ⅝ ⅞ Ⅰ Ⅱ Ⅲ Ⅳ Ⅴ Ⅵ Ⅶ Ⅷ Ⅸ Ⅹ Ⅺ Ⅻ Ⅼ Ⅽ Ⅾ Ⅿ ⅰ ⅱ ⅲ ⅴ ⅵ ⅶ ⅷ ⅸ ⅹ ⅺ ⅻ ⅼ ⅽ ⅾ ⅿ

ECMA-94: 27 dots width x 52 dots height

21H - 2FH: ! " # \$ % & ' () * + , - . /
 30H - 3FH: 0 1 2 3 4 5 6 7 8 9 : ; < = > ?
 40H - 4FH: @ A B C D E F G H I J K L M N O
 50H - 5FH: P Q R S T U V W X Y Z [\] ^ _
 60H - 6FH: ` a b c d e f g h i j k l m n o
 70H - 7FH: p q r s t u v w x y z { | } ~
 80H - 8FH:
 90H - 9FH:
 A0H - AFH: ¡ ¢ £ ¤ ¥ ¦ § ¨ © ª « ¬ ® ¯
 B0H - BFH: ° ± ² ³ ´ µ ¶ · ¸ ¹ º » ¼ ½ ¾ ¿
 C0H - CFH: À Á Â Ã Ä Å Æ Ç È É Ê Ë Ì Í Î Ï
 D0H - DFH: Ñ Ò Ó Ô Õ Ö × Ø Ù Ú Û Ü Ý Þ ß
 E0H - EFH: à á â ã ä å æ ç è é ê ë ì í î ï
 F0H - FEH: ð ñ ò ó ô õ ö ÷ ø ù ú û ü ý þ

| Index | Speed inch/s | Speed mm/s |
|-------|--------------|------------|
| A | 0.5 | 13mm/s |
| B | 1 | 25mm/s |
| C | 1.5 | 38 mm/s |
| D | 2 | 51 mm/s |
| E | 2.5 | 63 mm/s |
| F | 3 | 76 mm/s |
| G | 3.5 | 89 mm/s |
| H | 4 | 102 mm/s |
| I | 4.5 | 114 mm/s |
| J | 5 | 127 mm/s |
| K | 5.5 | 140 mm/s |
| L | 6 | 152 mm/s |
| M | 6.5 | 165 mm/s |
| N | 7 | 178 mm/s |
| O | 7.5 | 191 mm/s |
| P | 8 | 203 mm/s |
| Q | 8.5 | 216 mm/s |
| R | 9 | 227 mm/s |
| S | 9.5 | 241 mm/s |
| T | 10 | 254 mm/s |

Appendix. Table 3-1

Notes:

The range may vary with the printer models. For speed range of a specified printer model, please refer to user manual supplied with the printer.

Appendix 4 HEX, Binary file format

➤ **HEX File Format**

A hex image file consists of three parts.

| Record type | Format | Description |
|-------------|-------------|--|
| Data | 80xx[.....] | xx:Hex value specifying the numbers of bytes in one line. [.....]:Image data: One byte raster image consists of 2 hex digits. |
| Repeat data | 0000FFxx | xx:Repeating times. The later record specifies the data to be repeated. The maximum value of repeating times is 255 (FFH). If more than 255 repeatings needed, the user shall divide the total times into several parts to assure that each sub-value is within the limit. |
| End | FFFF | The end of HEX file |

Since BPLA uses system buffer to handle HEX file, the HEX file size shall not exceed the system buffer space.

The default system buffer is 32K bytes.

➤ **Binary File Format**

The format of binary files that can be accepted by BPLA is as follows.

At the beginning of the file, a variable in a word length is entered to specify the bit width of the binary bit-map.

Following the first variable is another variable in a word length to specify the line height of the binary bit-map.

After these two variables, the binary bit-map encoding data are given. The encoding format is of line encoding and the bytes are aligned. The length of the encoding data in bytes is $(width+7)/8*height$.

The entire binary file length in bytes is: 2 bytes(:bit width)+2bytes(:line height)+(width+7)/8*height(:bitmap encoding).

Appendix 5 Error Codes

When the Auto Status Return function is enabled, the error codes that could be transmitted through RS-232 port by the printer are described below.

Uppercase'I':

An invalid command sequence was sent to the printer. The printer did not understand the command sequence and terminated the command interpreter.

Uppercase'R':

This code is sent every time the printer is turned on signaling that there was a hardware reset.

Uppercase'T':

This code signals there was a software reset. The software reset is made by sending the immediate command <SOH># to the host.

Appendix 6 Paper Out Mode Explanation

➤ Reel mode

After a label is printed, the printer feeds paper to the print position (the start position for printing next label). In printing next label the printer shall start this position directly without any retraction course.

➤ Tear off mode

After a label is printed, the printer feeds paper to the tear off- position (tear-off blade position). In printing next label the printer shall retract paper to the print position first, and then it starts to print. After last label is printed, label shall stop at the tear off position.

Notes:

When the stop position is set without transmitting <STX>fnnn (or stop position is set as 0), first sensor status is tested or previous label is confirmed to be taken away via button before retracting paper to the print position. After taking away the label, the printer shall start to retract label to the print position and print next one. When using <STX>fnnn to set the stop position that is at 0, the printer shall retract label directly instead of checking the sensor status or the confirmation via button.

➤ Peel off mode

After the printer finish a label, the label is fed to the peel-off position (peel-off blade position) and wait for users to take it off (namely paper sensor or button functions). When next label is printed, the printer first retracts it to the print position, then start to operate. After last label is printed, label stops at the peel-off position.

Notea:

In peel off mode, <STX>fnnn has to set the stop position as 0 or is disabled. If <STX>fnnn sets the stop position not at 0, the paper sensor shall not be test, namely don't wait for users to take off the label.

➤ Cutter mode

After a label is printed, the printer feed label to the cut position (the cutter position) and cut off current label. When next label is printed, the printer retracts label to the print position first, then it shall print. After last label is printed and cut off, label shall retract the print position.

➤ Paper present unit

Paper present unit can be set by the label format command: ":n" or "c nn". This setting disable rewind mode and enable other needed modes. The printer shall decide to present paper once, tear off, peel off or cut action

after printing a certain pieces of label based on the present unit. If the present unit set is more than the quantity of paper in this lot, the printer shall proceed to present paper after printing this lot.

Notes:

If tear-off, peel-off or cut position has tolerance, you can adjust it via paper present distance. The present distance adjustment doesn't affect print vertical adjustment.

Appendix 7 Command index

| Command | Function |
|----------|---|
| <SOH># | Reset printer |
| <SOH>A | Send printer status in string |
| <SOH>B | Pause printing |
| <SOH>C | Stop/Cancel printing |
| <SOH>D | Shut down immediate commands |
| <SOH>E | Send batch quantity |
| <SOH>F | Send printer status in byte |
| <SOH>G | Send printer status in string |
| <SOH>H | Send printer status in byte |
| <STX> #A | Set parameter of erase head |
| <STX> #B | Set erase head PWM duty ratio |
| <STX>#D | Set gray mode |
| <STX>#E | Set watermark mode |
| <STX> % | Print Position Fine Adjustment |
| <STX> & | Feed and Back Labels |
| <STX>: | Set Character Smooth Enlargement mode on/off |
| <STX> A | Set LCD |
| <STX> a | Enable Auto Status Back |
| <STX>B | Set time and date of printer |
| <STX> b | Download Dot-matrix Bitmap Font |
| <STX> c | Set Paper Length |
| <STX> d | Set Printer to Double Buffer Mode |
| <STX> E | Set Quantity for Stored Label |
| <STX>e | Select transmissive sensor |
| <STX> F | Feed label |
| <STX> f | Set print stop position |
| <STX> G | Print current stored label |
| <STX> H | Enable Immediate Commands |
| <STX> h | Horizontally Duplicate Printing |
| <STX> I | Input Graphic Data |
| <STX> j | Software DIP Switch Setting |
| <STX> JB | Enable / disable auto verify function |
| <STX> Jb | Enable / disable auto verify function |
| <STX> JC | Enable verify by hand |
| <STX> JD | Self-test page/LED language settings |
| <STX> JE | Enable / disable error and reprint functions |
| <STX> JG | Enable / disable print graphic when verifying by hand |
| <STX> JZ | Enable / disable buzzer function |
| <STX> JY | Vertical print position adjustment command |
| <STX>JJ | Set Japanese addressing mode |
| <STX> K | Extended-system command |
| <STX> k | Test RS-232 interface |
| <STX> L | Enter label format mode |
| <STX> I | Set mirror image print |
| <STX> M | Set and search Maximum Label Length |
| <STX> m | Set Printer to Metric |
| <STX> N | Set Printer to Dot |
| <STX> n | Set Printer to Inch |
| <STX> o | Cutter test |
| <STX> p | Controlled pause |
| <STX> Q | Clear all Modules |
| <STX> q | Clear specified Module |

| | |
|----------|---|
| <STX> r | Select Reflective Sensor |
| <STX> S | Set Feed Rate |
| <STX> s | Set printer to single buffer mode |
| <STX> T | Printhead Dot Pattern Test Label |
| <STX> t | Test RAM memory Module |
| <STX> U | Label Format Field Replacement |
| <STX> u | Rotary printing |
| <STX> v | Printer's Firmware Version Information |
| <STX> W | Request Memory Module Information |
| <STX> w | Test FLASH Memory Module |
| <STX> X | Set default module |
| <STX> x | Delete Module File |
| <STX> Y | Output Sensor Values |
| <STX> Z | Print Internal Information and Dot Pattern |
| <STX> z | Pack Module |
| * | Explanatory Line |
| - | Explanatory Line |
| <STX>K | Printing offset adjustment |
| <STX>K D | Software-DIP switch setting |
| <STX>K f | Paper out offset adjustment |
| <STX>K m | Set Max length of label calibration |
| <STX>K M | Memory configuration |
| <STX>K Q | Memory configuration inquiry |
| <STX>K R | Reposition memory configuration |
| <STX>K S | Set size of system buffer |
| <STX>K W | Print buffering width configuration |
| <STX>Kw | Set print buffering width |
| ± | Makes last field entered increment numeric |
| - | Makes last field entered decrement numeric |
| ≥ | Makes last field entered increment alphanumeric |
| ≤ | Makes last field entered decrement alphanumeric |
| ^ | Set Count By Amount |
| & | Set Increment/Decrement Filed |
| : | Set Cut By Amount(4-Digit) |
| A | Set Format Attribute |
| C | Set Column Offset Amount |
| c | Set Cut By Amount(2-Digit) |
| D | Set Width and Height Dot Size |
| E | Terminate Label Formatting Mode and Print Label |
| e | Terminate Label Formatting Mode and Print Label(Without paper presenting actions) |
| G | Place Data to Global Register |
| g | Set Character Space |
| H | Set Print Darkness |
| M | Select Mirror Mode |
| m | Set Metric Mode |
| N | Set Dot Mode |
| n | Set Inch Mode |
| P | Set Print Speed |
| p | Set Label Back Speed |
| Q | Set Quantity of Labels to be Printed |
| R | Set Row Offset Amount |
| r | Recall Stored Label Format |
| S | Set Paper Feeding Speed |
| s | Store Label Format in Module |
| T | Set Field Data Line Terminator |
| t | Set Layout |
| X | Terminate Label Formatting Mode without printing |
| z | Zero (0) Conversion to "0" |
| <STX>S | Recall Data from a Specified Global Register |
| <STX>T | Real-time clock printing |
| * | Explanation Line |
| - | Explanation Line |
| #A | Set English fonts code |
| #B | Set column offset for English against Chinese |
| #Q | Clear assigned area of label |

